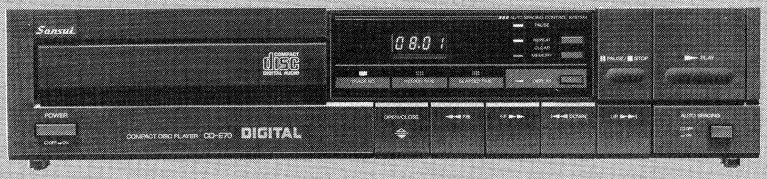
SERVICE MANUAL

COMPACT DISC PLAYER

SANSUI CD-E70



CAUTION

1. Parts identified by the ⚠ symbol on the schematic diagram and the parts list are critical for safety. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

Sansui

SANSUI ELECTRIC CO., LTD.

• SPECIFICATIONS

Type	Comppact disc digital audio system
Optical pick-up	3-beam laser
Error correction	CIRC
D/A conversion	16 bit linear
Frequency response	5 Hz ~ 20 kHz
Harmonic distortion	Less than 0.003% (1 kHz)
Signal-to-noise ratio	100 dB (IEC-A-WTD)
Dynamic range	Better than 95 dB
Wow and Flutter	Below measurable limits
Channel separation	Better than 90 dB (1 kHz)
Output voltage	2V
Power requirements	110~120V/220~240V (50/60 Hz)
For U.S.A. and Canada	120V (60 Hz)
Power consumption	13 watts
Dimensions	380 mm (5″)W 82 mm (3-1/4″)H 313 mm (12-3/8″)D
Weight	3.6 kg (7.9 lbs) net

- **Design and specifications subject to changes without notice for improvements.**
- **Due to local laws and regulatins, this unit sold in some areas are not equipped with variable voltage selectors.**

CAUTION

1. The symbols, UL, CSA, SA, BS, UK, EU, AS and XX on the parts list and the schematic diagram mean followings respectively.
   - UL ..... Manufactured for U.S.A market. (Underwriters Laboratories approved model.)
   - CSA ..... Manufactured for Canadian market.
   - SA ..... Manufactured for South African market.
   - BS, UK ..... Manufactured for United Kingdom market.
   - EU ..... Manufactured for European market.
   - AS ..... Manufactured for Australian market.
   - XX ..... Standard Version.
   - NON MARK ..... Common Parts.
2. Some printed circuit boards are not supplied as the assembled. To separate these in this service manual, the stock No's are not indicated at the ends of the board names. However, the individual parts on the circuit boards are provided by orders.
3. Since some of capacitors and resistors are omitted from parts lists in this service manual, refer to the Common Parts List for capacitors & resistors, which was issued on February 1983.
4. Abbreviations in this service manual are as follows.

• Abbreviations List

C.R.	: Carbon Resistor	E.B.L.	: Low Leakage Bi-Polar Electrolytic Capacitor
S.R.	: Solid Resistor		
W.R.	: Wire Wound Resistor	Ta.C.	: Tantalum Capacitor
M.R.	: Metal Film Resistor	F.C.	: Film Capacitor
F.R.	: Fusing Resistor	M.P.	: Metallized Paper Capacitor
N.I.R.	: Non-Inflammable Resistor		
R.A.	: Resistor Array	P.C.	: Polystyrene Capacitor
C.C.	: Ceramic Capacitor	G.C.	: Gimmic Capacitor
C.T.	: Ceramic Capacitor, Temperature Compensation	C.A.	: Capacitor Array
		V.R.	: Variable Resistor
E.C.	: Electrolytic Capacitor	SW.	: Switch
E.L.	: Low Leak Electrolytic Capacitor	Chip R.	: Chip Resistor
		Chip C.	: Chip Capacitor
E.B.	: Bi-Polar Electrolytic Capacitor		

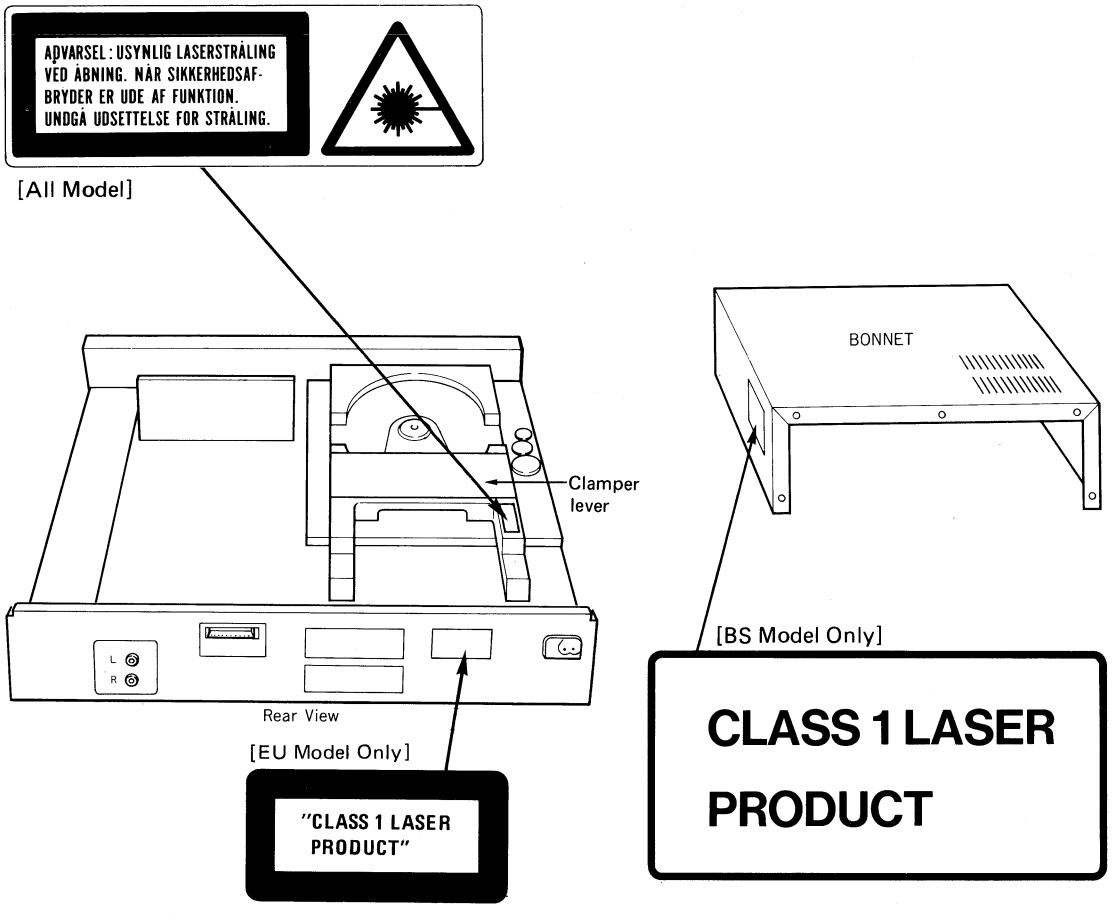
Cautions concerning handling of the laser

A. Cautionary points to minimize danger.

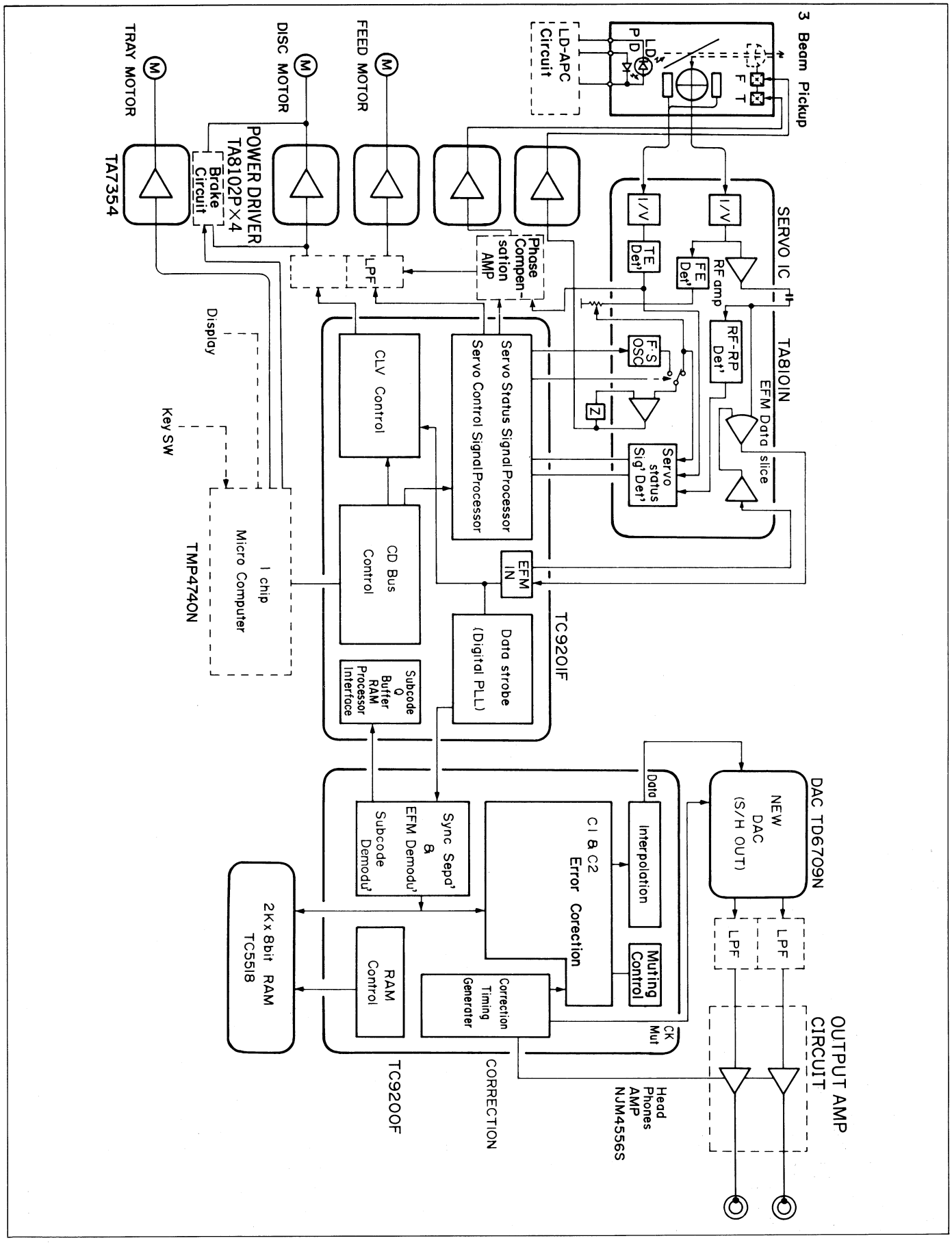
1 Since the laser beam is extremely dangerous when viewed directly at its source, do not look directly at the laser pick-up assembly when the laser beam is being output. Additionally, even when viewing the laser beam only, be sure that you are at least 30cm away from it when it is in operation.

2 When the laser beam is in operation, do not bring any part of your body into direct contact with or inclose proximity to the convex lens.

B. The following label has been affixed to the unit, listing the proper procedure for working with the laser beam.

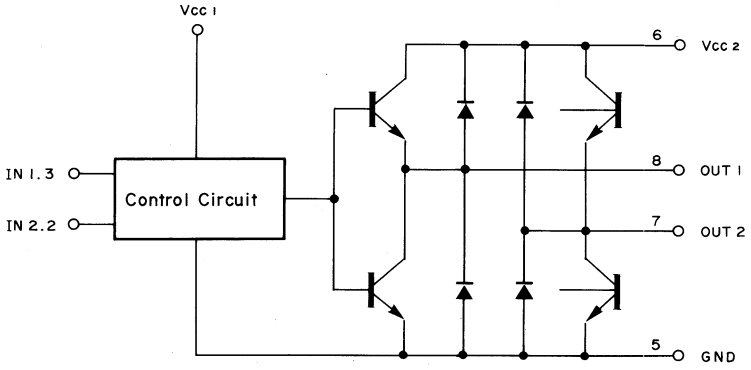

ADVARSEL: USYNLIG LASERSTRÅLING VED ÅBNING. NÅR SIKKERHEDSAFBRYDER ER UDE AF FUNKTION. UNDGÅ UDSETTELSE FOR STRÅLING.
[All Model]
Clamper lever
Rear View
[EU Model Only]
"CLASS 1 LASER PRODUCT"
BONNET
[BS Model Only]
CLASS 1 LASER PRODUCT

1. BLOCK DIAGRAM



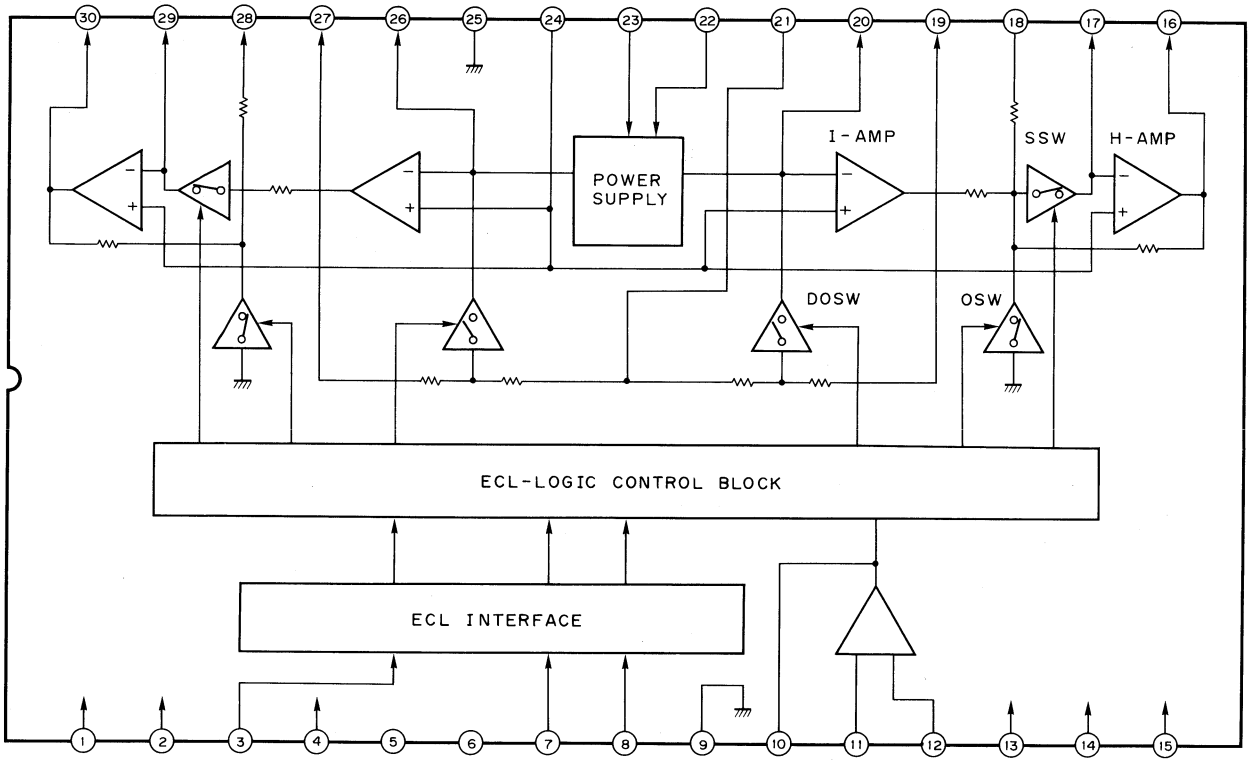
2. INTERIOR BLOCK DIAGRAM&TERMINAL FUNCTION OF IC

• TA7354P (Motor Drive)



IN 1	IN 2	OUT 1	OUT 2	MODE
1	1	L	L	BRAKE
0	1	L	H	FORWARD/REVERSAL
1	0	H	L	REVERSAL/FORWARD
0	0	HIGH IMPEDANCE		STOP

• TD6709N (16Bit D/A Converter)

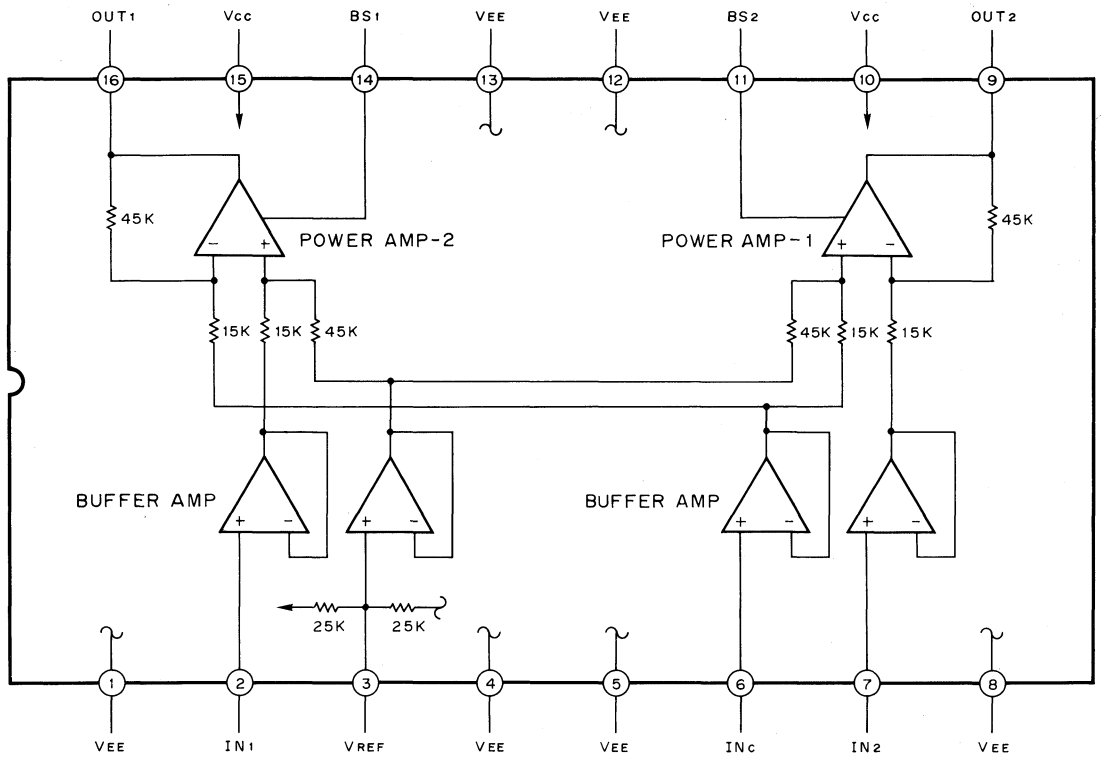


Terminal Functions < TD6709N >

Pin No.	Terminal Functions
1	Analog positive power voltage pin +5V
2	ECL logic analog power voltage pin +5V
3	Bit clock input pin Duty cycle: 50%, f=1.4112MHz
4	Digital power voltage pin +5V
5, 6	Not connected
7	PCM digital audio data input pin Inputs data serially (16 bits a time) from MSB, synchronically with BCK trailing edge.
8	Input data channel indication signal input pin Signal must be input synchronically with BCK trailing edge.
9	Ground pin
	Oscillator circuit I/O pin. The Colpitts oscillator circuit is formed by assembling L, C & R to SAW resonator or X'tal oscillator.
13	ECL logic power voltage pin +5V
14, 15	Analog negative power voltage pin − 5V

Pin No.	Terminal Functions
16	Rch sample/hold amplifier output pin
17	Rch sample/hold amplifier negative input pin
18	Rch output offset adjustment pin. Normally connected to GNDA.
19	Rch integrated amplifier output pin
20	Rch integrated amplifier negative output pin
21	Discharge circuit reference voltage pin
22	Current source fine adjustment pin. Normally connected to GNDA.
23	Reference current input pin
24	Ground pin
25	Analog ground pin
26	Lch integrated amplifier negative output pin
27	Lch integrated amplifier output pin
28	Lch output offset adjustment pin. Normally connected to GNDA.
29	Lch sample/hold amplifier negative input pin
30	Lch sample/hold amplifier output pin

• TA8102P (Power Driver)

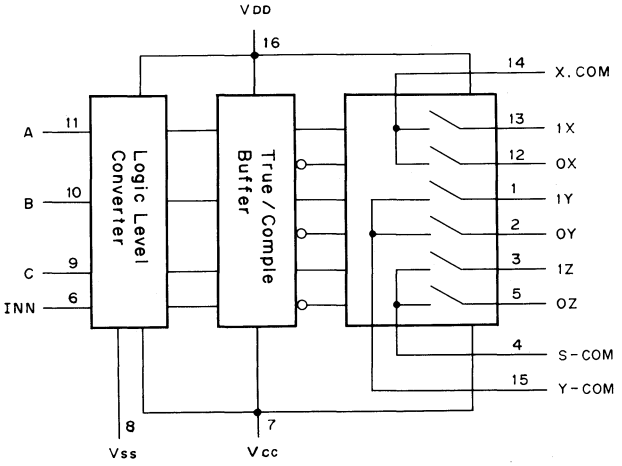


Terminal Functions < TA8102P >

Pin No.	Terminal Functions
1	Negative power voltage pin
2	Power amplifier 1 control signal input pin
3	Reference voltage source pin
4,5	Negative power voltage pin
6	Power amplifier 1/2 common control signal input pin
7	Power amplifier 1/2 control signal input pin
8	Negative power voltage pin

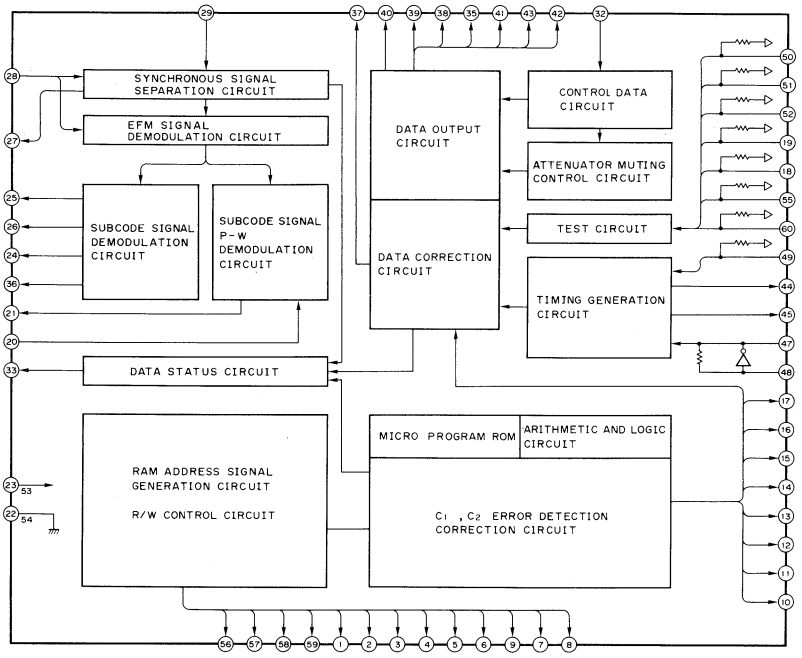
Pin No.	Terminal Functions
9	Power amplifier 2 output pin IN_2 & IN_C error signal amplifier output
10	Positive power voltage pin
11	Boothstrap pin 2
12,13	Negative power voltage pin
14	Boothstrap pin 1
15	Positive power voltage pin
16	Power amplifier 1 output pin IN_2 & IN_C error signal amplifier output

• TC4053BP/BF (Multiplexer)



CONTROL INPUT				"ON"
INHIBIT	C	B	A	CHANNEL
L	L	L	L	0X,0Y,0Z
L	L	L	H	1X,0Y,0Z
L	L	H	L	0X,1Y,0Z
L	L	H	H	1X,1Y,0Z
L	H	L	L	0X,0Y,1Z
L	H	L	H	1X,0Y,1Z
L	H	H	L	0X,1Y,1Z
L	H	H	H	1X,1Y,1Z
H	X	X	X	NONE
X: Don't Care Ex				

- **TC9200F (Data processor)**

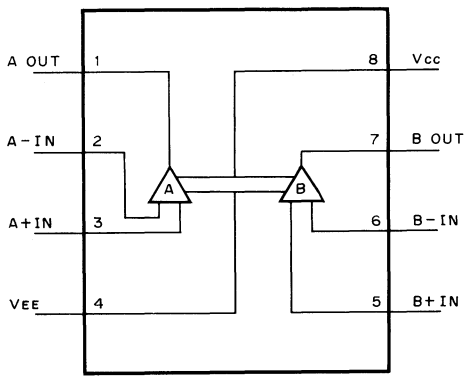


Terminal Functions < TC9200F >

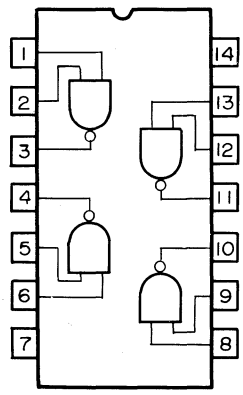
Pin No.	Terminal Functions
56 ~ 59	External RAM (8 bit x 2K) address signal output pin
7	External RAM read/write signal output pin
8	External RAM chip-enable signal output pin
10 ~ 17	External RAM data bus line
18 19	Test pin Normally used at "H" or open.
20	Subcode P-W and S0 + S1, SBOKK data read clock pin
21	Subcode P-W output pin. Sets data in internal registers at the PFCK trailing edge. Outputs data serially when EXCK is input.
22	Ground pin
23	Power pin
24	Subcode signal Q data CRC check result output pin. "H" when there are no errors; "L" when an error occurs. The result of checking the previous block of Q data (80 bits) is output.
25	Subcode signal Q data output pin Q data is synchronized with PFCK trailing edge and output.
26	Subcode sync. S0 & S1 output pin When subcode sync. S0 or S1 is detected, outputs H level synchronically with PFCK trailing edge.
27	Playback frame periodic signal output pin Duty cycle approx. 50%; f = 7.35kHz
28	Data read clock input pin Clock formed on the PLL circuit on the basis of the RF signal played back from the disc. 4.32MHZ with PLL phase locked. Duty cycle: approx. 50%
29	EFM signal input pin Signal is input synchronically with PLCK trailing edge.
30, 31	Not connected
32	Control data serial input pin Inputs data frame-wise serially from TC9201F.
33	Processor status signal output pin Outputs serially the synchronization condition, correction process results and memory buffer capacity per frame.
34	Correction frame sync. signal output pin f = 7.35kHz (X'tal divided)

Pin No.	Terminal Functions
35	Word clock output pin BCK divided into 16. Duty cycle: 50%; f = 88.2kHz
36	Emphasis on/off indication signal output pin Q data control bit emphasis check output. "H" when emphasis is on. Active when CRC check result turns positive twice consecutively.
37	Output data correction flag output pin Adds a flag each 8 bits and outputs LSB and MSB flags (in that order) along with the data, and synchronically with SYCK trailing edge. "H" for correction data.
38	Channel clock output pin WDCK divided into 2. Lch data is output when level is "L", and Rch data when level is "H". Duty cycle: 50%, f = 44.1kHz.
39	Bit clock output pin Duty cycle: 50%, f = 1.4112kHz
40	Data output pin Outputs data serially from MSB, synchronically with BCK trailing edge.
41	Symbol clock output pin BCK divided into 8. Duty cycle: 50%, f = 176.4kHz
42	Rch data aperture signal output pin
43	Lch data aperture signal output pin
44	8M clock output pin X'tal (16.9344MHz) divided into 2.
45	17M clock output pin X'tal (16.9344MHz) buffer output.
46	Not connected
47, 48	Crystal oscillator connection pin. Connected to a crystal oscillator, generates the clock signal required by the system. X'tal 16.9344MHz
49	Clock selection pin.Sets X-I input clock to 16.9344MHz when "H" or open, and to 8.4672MHz when "L".
50 ~ 52	Test pin Normally used at "H" or open.
53	Power pin
54	Ground pin
55, 60	Test pin

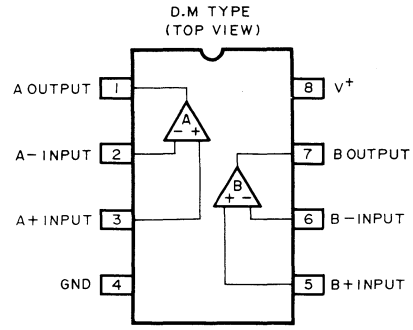
- **NJM2068D (Operational Amp.)**



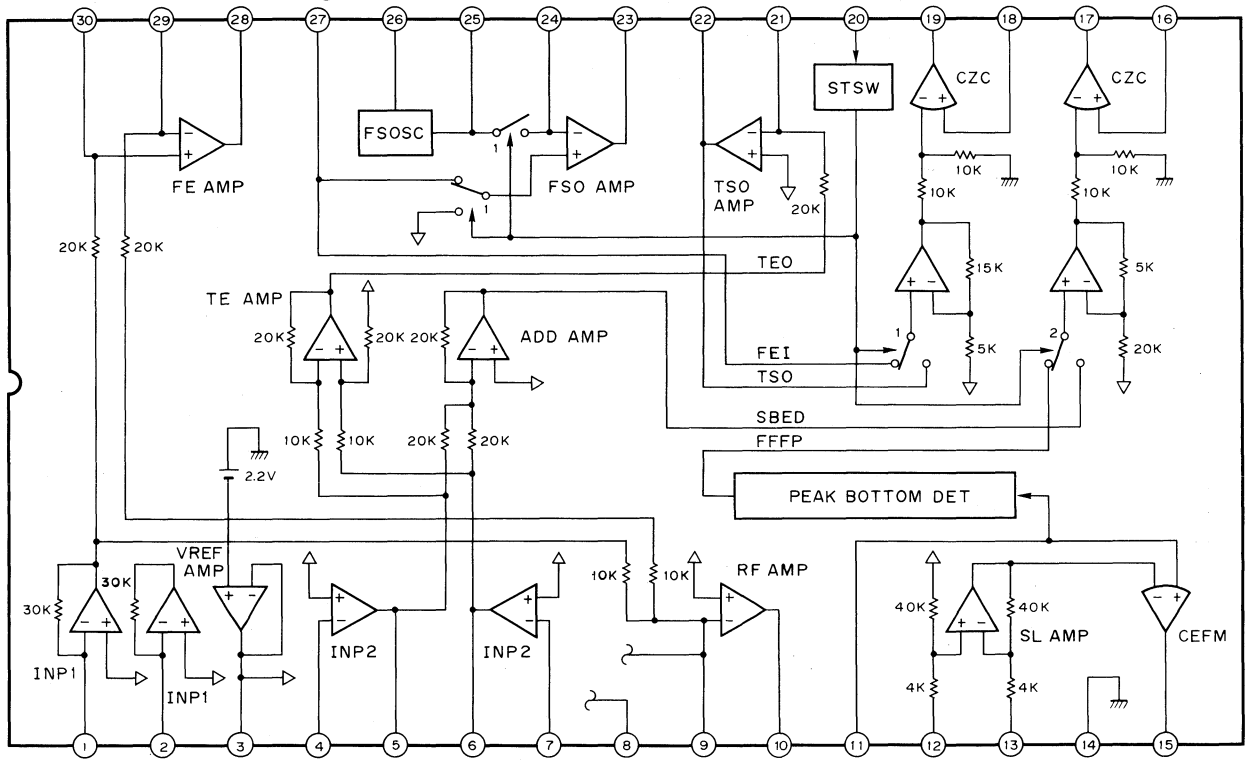
- **TC4011BP/BF (NAND Gate)**



- **NJM2904D (Operational Amp.)**



- **TA8101N (Focus & Tracking Servo)**

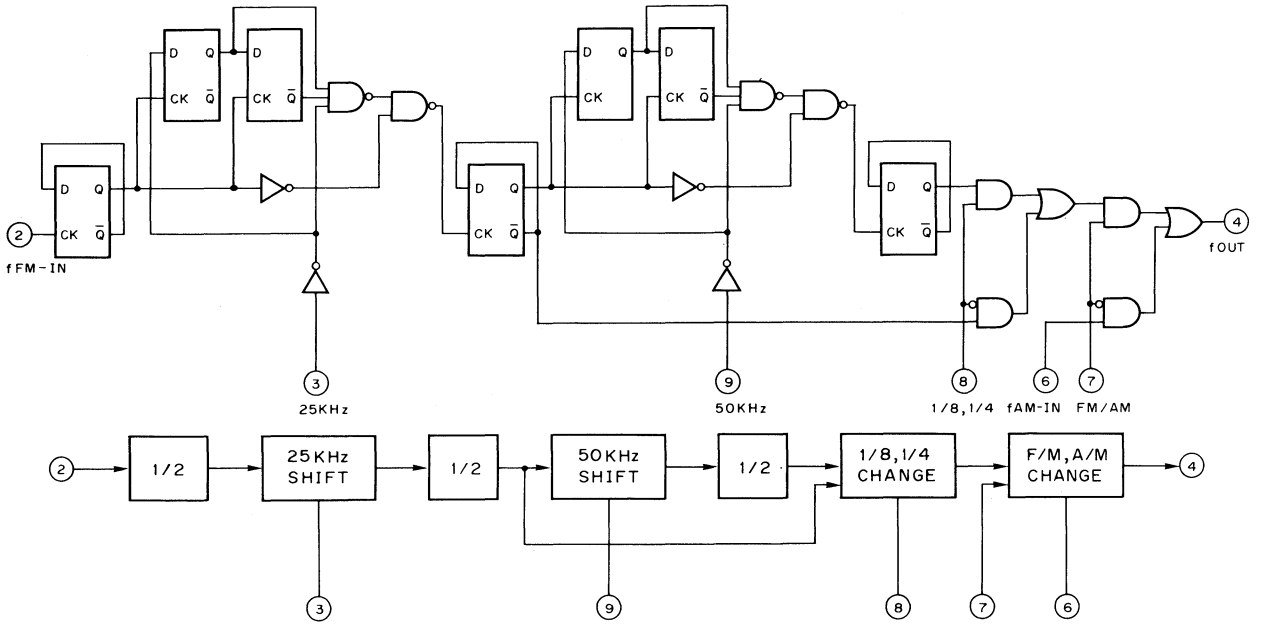


Terminal Functions < TA8101N >

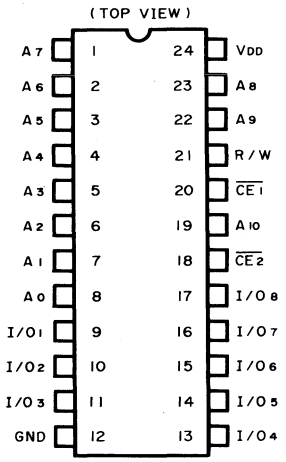
Pin No.	Terminal Functions
1,2	Main beam (1-V) converter 1, 2 input pins
3	Reference voltage source output pin (+2.2V)
4	Sub-beam (1-V) converter 1 input pin
5,6	Sub-beam (1-V) converter 1, 2 input pins
7	Sub-beam (1-V) converter 2 input pin
8	Power pin (+5V)
9	RF amplifier antiphase input pin
10	RF amplifier output pin
11	RF amplifier input pin
12	Slice level control amplifier in-phase input pin
13	Slice level control amplifier antiphase input pin
14	Ground pin
15	EFM signal data slicer output pin Open collector output
16	Status comparator 2 in-phase input pin

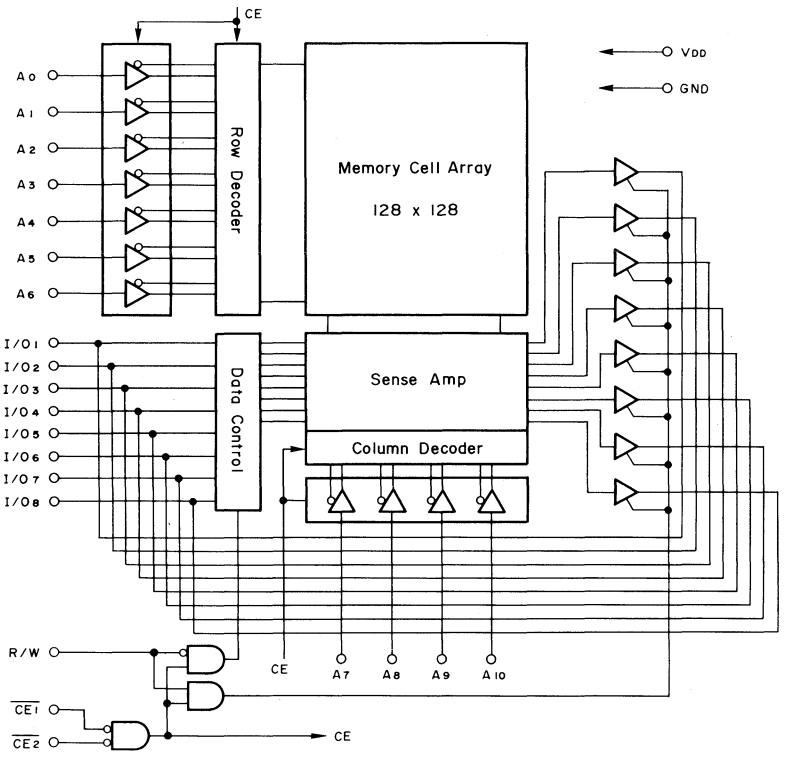
Pin No.	Terminal Functions
17	Status comparator 2 output pin Open collector output.
18	Status comparator 1 in-phase input pin
19	Status comparator 1 output pin Open collector output.
20	Analog switch control signal input pin
21	Tracking servo amplifier antiphase input pin
22	Tracking servo amplifier output pin
23	Focus servo amplifier output pin
24	Focus servo amplifier antiphase input pin
25	Focus search signal generation condenser connection pin
26	Built-in current source control pin
27	Focus error signal input pin
28	Focus error amplifier output pin
29	Focus error amplifier antiphase input pin
30	Focus error amplifier in-phase input pin

• TD6102P (Pre-Scaler)

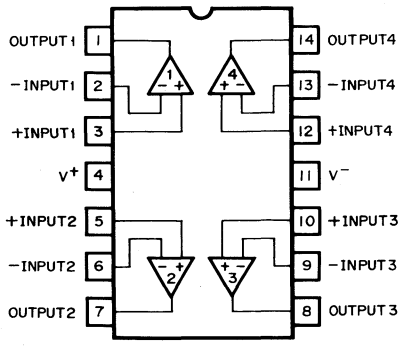


• TC5518BF (Static RAM)

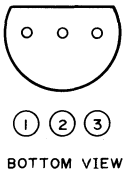


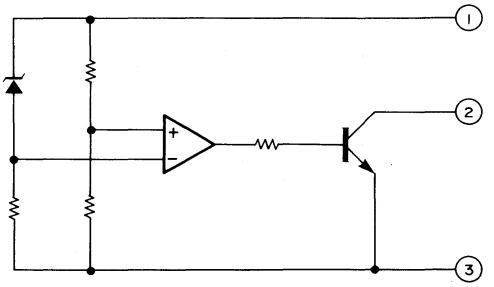


• NJM3403AD (Operational Amp.)

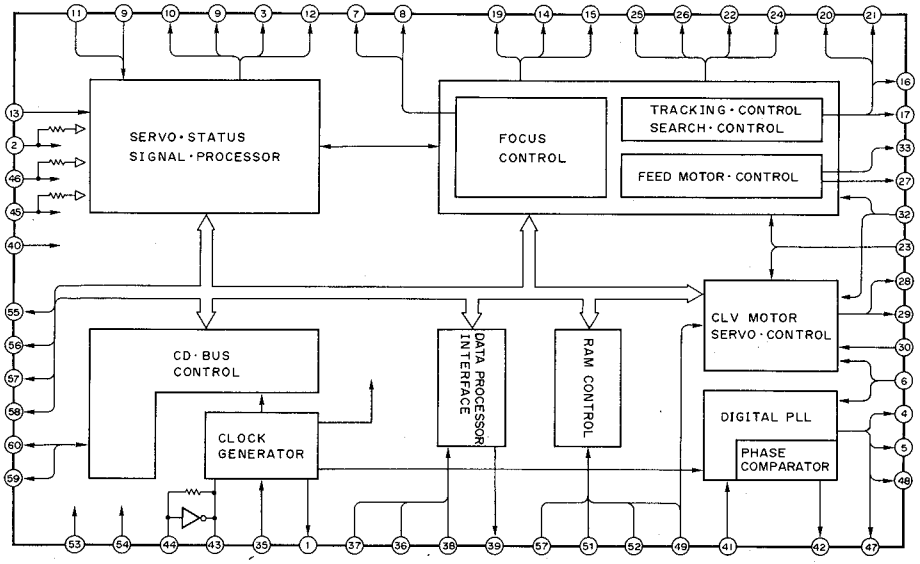


• PST520D (Reset IC)





- **TC9201F (Servo Processor)**

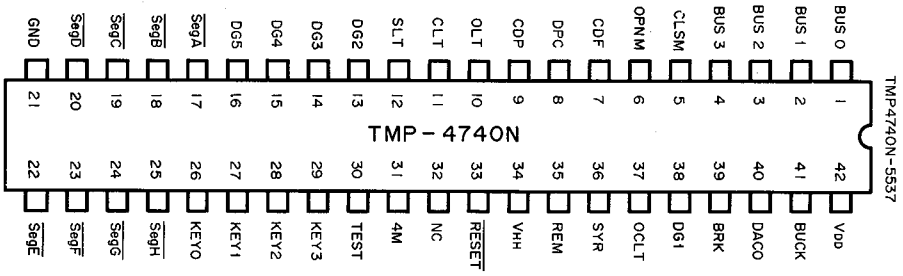


Terminal Functions < TC9021F >

Pin No.	Terminal Functions
1	4M clock output pin f=4.2336MHz (X'tal divided)
2	Reset input pin. Normally "H" or open. "L" for internal system reset.
3	Laser diode drive circuit control signal output pin
4	EFM signal normal output pin
5	EFM signal inversed output pin
6	EFM signal input pin
7	Focus actuator drive signal polarity indication output pin
8	Built-in DA converter output pin 2
9	External comparator output signal input pin 2
10	Built-in DA converter output pin 1
11	External comparator output signal input pin 1
12	Pickup servo mode indication output pin
13	Built-in DA converter power pin (+2.1V)
14, 15	Focus gain adjustment analog switch output pin
16, 17	Tracking gain adjustment analog switch output pin
18	Focus actuator brake signal output pin
19	Focus actuator drive signal output pin
20	Tracking actuator kick signal output pin
21	Defect detection pin. Only during normal playback, detects PU output signal defects, setting electric potential to VR2 during detection. Normally "Hi-Z".
22	Tracking servo loop middle/upper range phase compensator commutation analog switch input pin
23	Power pin
24	Tracking servo loop lower range gain commutation analog switch input pin
25	Tracking error signal sample/hold analog switch input pin
26	Tracking servo operation on/off analog switch input pin
27	Forward servo operation on/off analog switch input pin
28	Disc motor CLV servo AFC output pin
29	Disc motor CLV servo APC output pin
30	Disc motor drive circuit gain commutation analog switch input pin
31	Forward servo loop gain commutation analog switch input pin
32	Pickup servo circuit & disc servo circuit reference power pin +2.1V
33	Feed motor forward/backward drive control signal output pin
34	Pickup servo circuit & disc servo circuit power pin. +4.2V

Pin No.	Terminal Functions
35	8M clock input pin f=8.4672MHz (X'tal divided)
36	Control data transmission/reception clock input pin
37	Correction frame periodic signal input pin f=7.35kHz
38	Status signal serial input pin
39	Control data serial input pin
40	Test pin. Normally "L".
41	PLL circuit selection pin. "H": analog PLL circuit "L": digital PLL circuit
42	PLL phase-comparison signal output pin
43, 44	Crystal oscillator connection pin. Connected to a crystal oscillator, generates the clock required by the system.
45, 46	Test pin (w/pull-up resistance) Normally "H" or open.
47	EFM signal output pin
48	Bit clock output pin
49	Playback frame periodic signal input pin. SUEQ, SBOK and SOS1 are input synchronically with the trailing edge. Used as the CLV servo AFC & APC relative frequency.
50	Subcode signal simultaneous pattern S0, S1 input pin
51	Subcode signal Q data input pin. Regarding 80 bits of Q data as one block, inputs it serially and saves it on the internal RAM.
52	Subcode signal CRC check result input pin. "H" while there are no errors, otherwise "L".
53	Power pin. +5V
54	Ground pin
55~58	Commands & data transmission/reception bus line. Inputs commands and data during BUCK leading edge. Outputs the input data to the bus while BUCK is "H".
59	Commands & data processing control I/O. turns "L" (input) when the microcomputer sends the first command word. When all commands and data have been correctly received, this pin turns to "L" (output) while BUCK is "L". Used as acknowledge (ACK) for the microcomputer. Normally "H".
60	Commands & data transmission/reception clock input pin. "H" while it is not receiving anything from the microcomputer. "L" during reception, for 9μs or more. "H" periods are 4μs — 90μs long. Switching between DA/CO.BUS 0 — 3 4μs after BUCK trailing edge.

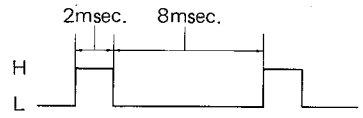
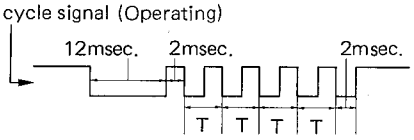
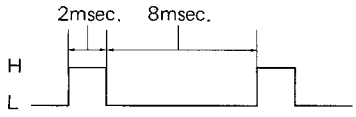
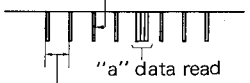
- **TMP4740N-5534 (Micro Computer)**


GND SegD SegC SegB SegA DG5 DG4 DG3 DG2 SLT CLT OLT CDP DPC CDF OPNM CLSM BUS 3 BUS 2 BUS 1 BUS 0
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
TMP-4740N
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
SegE SegF SegG SegH KEY0 KEY1 KEY2 KEY3 TEST 4M NC RESET VHH REM SYR OCLT DGI BRK DACO BUCK VDD
TMP4740N-5537

Terminal Functions < TMP4740N-5534 >

Pin No.	Port		Signal	I/O	Initial level	Function/Operation	During Playback Mode	During Stop Mode
1	R4	R40	BUS O	I/O	H	I/O data bus with the servo control IC TC9201	H or L	
2		R41	BUS 1	I/O	H	I/O data bus with the servo control IC TC9201	H or L	
3		R42	BUS 2	I/O	H	I/O data bus with the servo control IC TC9201	H or L	
4		R43	BUS 3	I/O	H	I/O data bus with the servo control IC TC9201	H or L	
5	R5	R50	CLSM	OUT	L	Tray motor control output "H" for tray closing operation.	H	
6		R51	OPNM	OUT	L	Tray motor control output "H" for tray opening operation.	H	
7		R52	CDF	OUT	L	CD function signal Outputs a 100msec. positive pulse when PLAY key is activated.	L	
8		R53	DPC	OUT	L	Deck pause control signal output "H" for starting C-DECK, "L" for stopping it.	H or L	L
9	R6	R60	CDP	IN	X	CD pause control signal input When "L" the DC player enters the PAUSE mode (not PLAY).	H or L	
10		R61	OLT	IN	X	Open limit switch input Becomes "L" when the tray has fully opened.	H	
11		R62	CLT	IN	X	Close limit switch input Becomes "L" when the tray has been fully closed and the disc clamped.	L	
12		R63	SLT	IN	X	Start limit switch input Becomes "L" when PU enters the TOC area.	H or L	L
13	R7	R70	DG 2	OUT	L	Display selection signal output (selected when "H") Key scan output		
14		R71	DG 3	OUT	L	Display selection signal output Key scan output		
15		R72	DG 4	OUT	L	Display selection signal output		
16		R73	DG 5	OUT	L	Display selection signal output		
17	P1	P10	$\overline{\text{Seg A}}$	OUT	H	Segment display output (turns on when "L") (1) "a" segment (2) Colon 1	H/L	
18		P11	$\overline{\text{Seg B}}$	OUT	H	Segment display output (turns on when "L") (1) "b" segment (2) PAUSE Indicator	H/L	
19		P12	$\overline{\text{Seg C}}$	OUT	H	Segment display output (turns on when "L") (1) "c" segment (2) Colon 2	H/L	
20		P13	$\overline{\text{Seg D}}$	OUT	H	Segment display output (turns on when "L") (1) "d" segment (2) REPEAT Indicator	H/L	

< TMP4740N-5534 >

Pin No.	Port		Signal	I/O	Initial level	Function/Operation	During Playback Mode	During Stop Mode
22	P1	P20	$\overline{\text{Seg E}}$	OUT	H	Segment display output (turns on when "L") (1) "e" segment (2) TNO Indicator	H/L	
23		P21	$\overline{\text{Seg F}}$	OUT	H	Segment display output (turns on when "L") (1) "f" segment (2) LAP Indicator	H/L	
24		P22	$\overline{\text{Seg G}}$	OUT	H	Segment display output (turns on when "L") (1) "g" segment (2) REMAIN Indicator	H/L	
25		P23	$\overline{\text{Seg H}}$	OUT	H	Segment display output (turns on when "L") (1) "h" segment (2) MEMORY Indicator	H/L	
26	K0	K00	KEY 0	IN	X	Key sense signal input (1) PLAY (2) DISPLAY (3) Don't STOP	When the key is activated 	
27		K01	KEY 1	OUT	X	Key sense signal input (1) PAUSE (2) MEMORY		
28		K02	KEY 1	OUT	X	Key sense signal input (1) UP (2) REPEAT		
29		K03	KEY 3	OUT	X	Key sense signal input (1) DOWN (2) EJECT		
35	R8	R80	REM	I/O	"H" (INPUT MODE)	Remote control data input	Initial level is "H" 1 cycle signal (Operating)  T switches between 4 and 8msec. according to data	
36		R81	SYR	IN	X	Synchro recording mode setting input Turns synchro on when "L", off when "H".	H or L	
37		R82	OCLT	IN	X	Tray motor overcurrent detection signal input	H	
38		R83	DG 1	OUT	L	Display selection signal output (selected when "H")		
39	R9	P90	BRK	OUT	L	Disc motor brake drive signal output Outputs a pulse within 1.2sec. of stopping the disc motor.	L	
40		P91	DA/CO	I/O	"H" (INPUT MODE)	CD bus drive signal	H/L	H
41		R92	BUCK	OUT	H	Shift clock for data transmission with TC9201	H/L Status read  Pulse generated at 2msec. periods	H
21		VSS	GND			Power (0V)		
30		TEST	TEST	IN		Test mode pin X Connected to GND		
31		XIN	4M	IN		Basic clock input pin		
32		XOUT	NC	OUT		Open		
33		$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	IN		Initialize signal input Initialize operation carried out when "L".		
34		V_{HH}	V_{HH}			Memory backup power Connected to VDD.		
42		V_{DD}	V_{DD}			Power (+5V)		

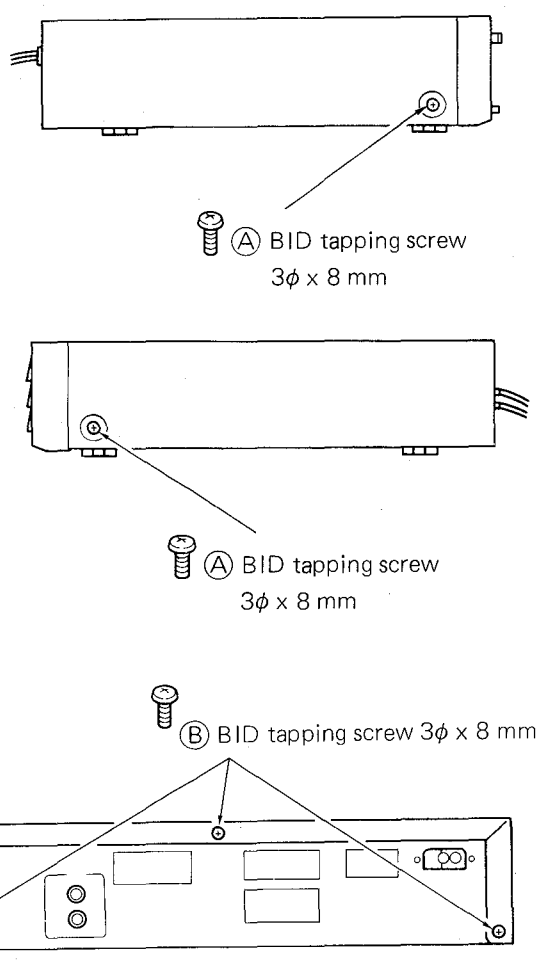
3. DISASSEMBLY PROCEDURES

(For parts whose numbers are mentioned in the text, refer to the exploded view of mechanism on page 14.)

3-1. Removal of Top Cover

1. Remove the two screws Ⓐ from the side and the three screws Ⓑ from the back, then remove the bonnet.

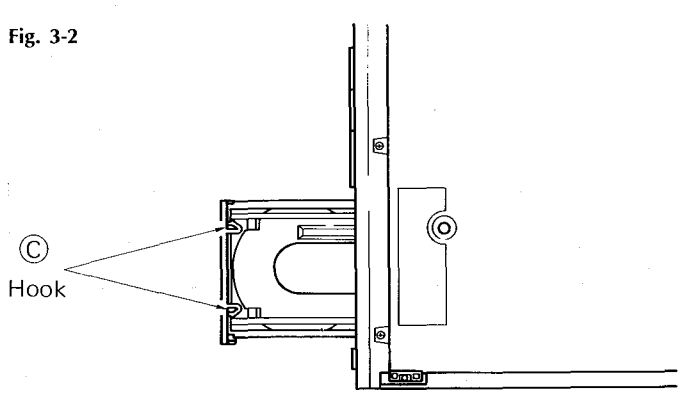
Fig. 3-1



3-2. Removal of Tray Panel

1. Open the disc tray ①.
2. Detach the two hooks Ⓒ on the bottom of the tray panel then remove the tray panel.

Fig. 3-2

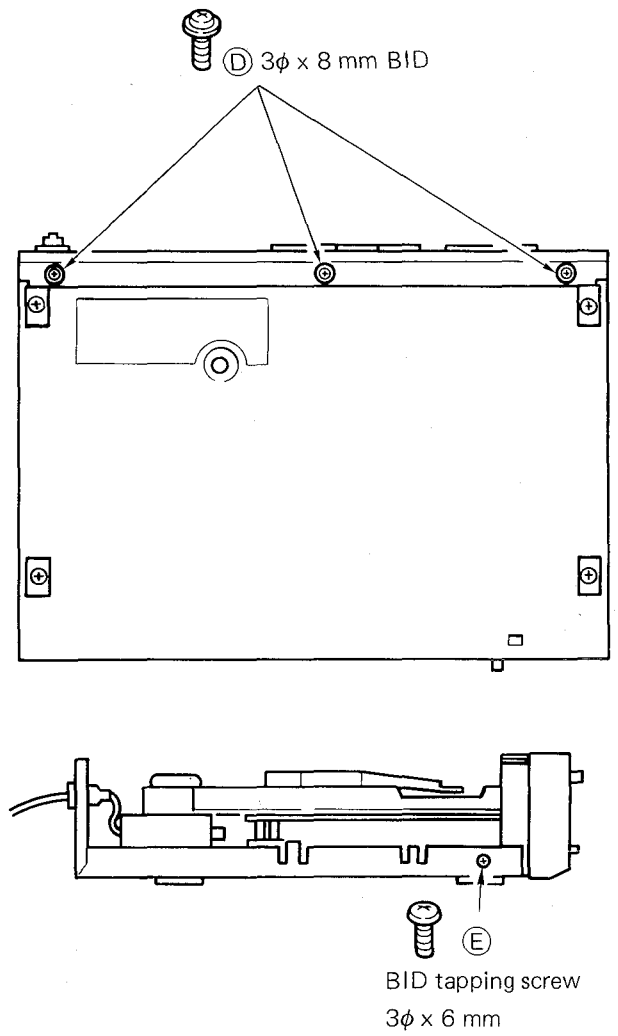


3-3. Removal of Front Panel

1. Remove the tray panel.
2. Remove the three screws Ⓓ from the bottom and the two screws Ⓔ from the side, then remove the front panel.

* Be careful of the lead wires of the display PC board attached to the front panel.

Fig. 3-3

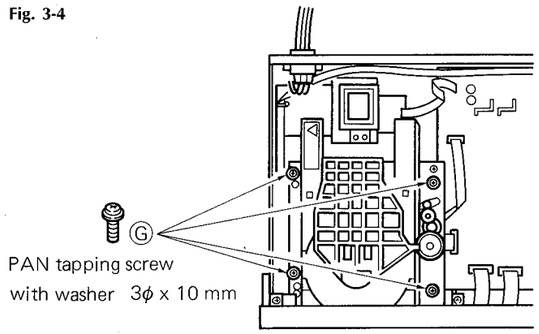


3-4. Removal of Mechanism Assembly

1. Remove the front panel.
2. Remove the four mechanism fixing screws Ⓖ then remove the mechanism assembly.

* Be careful of the lead wires of the mechanism PC board attached to the mechanism.

Fig. 3-4



3-5. Disassembly of Mechanism

1. Push the clamper lever ass'y ㉖ down and the hook Ⓐ sideways to remove the clamper lever ass'y ㉖. (Fig. 3-5)
2. Pull the disc tray ① in the direction of the arrow Ⓑ and detach it. (Fig. 3-6)
3. Remove the two screws Ⓒ (Fig. 3-7) and one screw Ⓓ (Fig. 3-8), then remove the loading motor PC board.
4. Remove the one screw Ⓔ and then loosen two screws ㉞ to remove the pickup motor assembly ⑬. (Fig. 3-8)
5. Remove the four screws Ⓕ then remove the pickup ⑰. (Fig. 3-8)
6. Remove the disc table ⑦ and the two screws Ⓖ, then remove the disc motor assembly. (Fig. 3-7)

Fig. 3-5

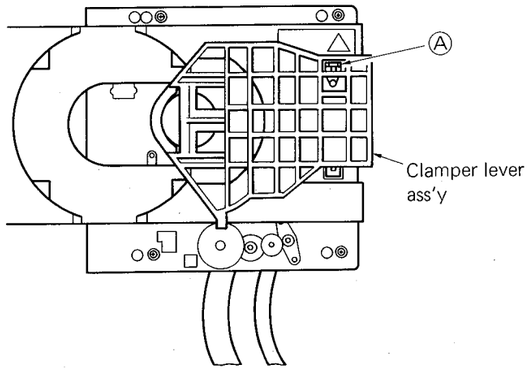


Fig. 3-6

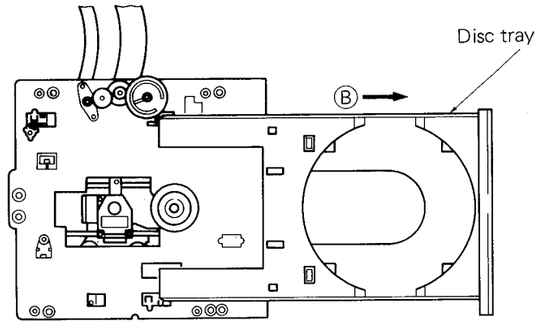


Fig. 3-7

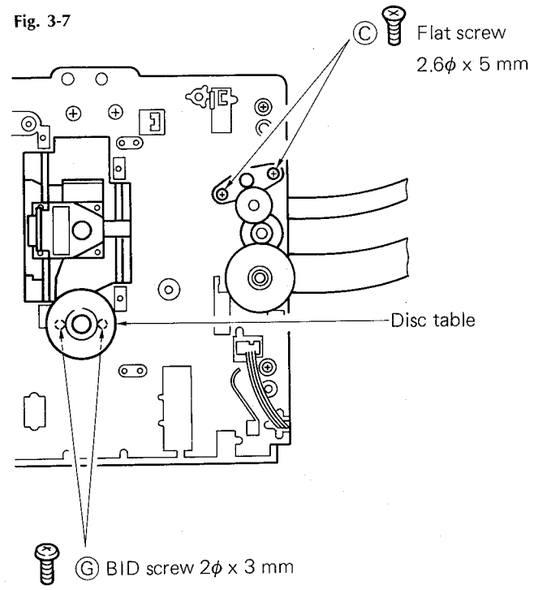
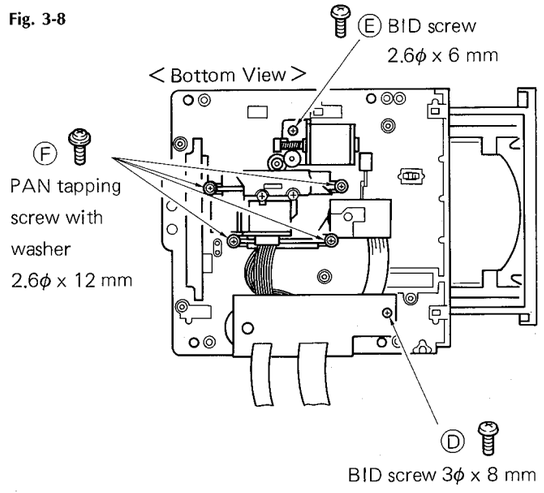


Fig. 3-8



3-6. Cautions When Inserting The Disc Tray

1. Insert the disc tray ① securely into the 5 guides on the main chassis, and push it in as far as it will to (until the clamper lever ㉖ goes down).
2. Lift the clamper lever with your hand and mount the switch lever ⑩, cam gear ④ and bushing ㉗ as shown in Fig. 3-9 and 3-10.
3. Check disc tray open/close and play/stop operations.

Fig. 3-9

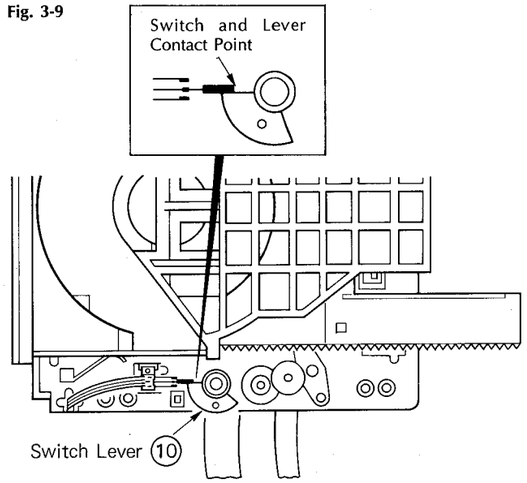
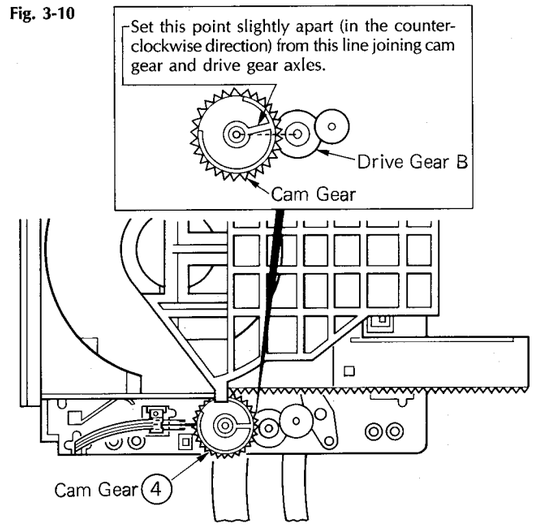


Fig. 3-10


Set this point slightly apart (in the counter-clockwise direction) from this line joining cam gear and drive gear axles.
Drive Gear B
Cam Gear
Cam Gear ④

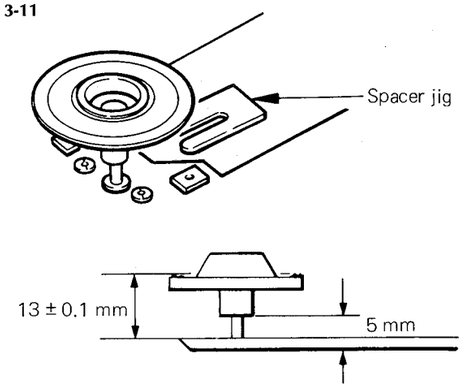
3-7. Disc Table Installation

Place the included spacer (5mm) between the main chassis and the disc table ⑦, then press on the center of the disc table ⑦ until it touches the spacer (13 ± 0.1mm from rubber on disc table).

• **Note:**

1. When installing the disc table, make sure it does not come into contact with the pickup ⑰ or disc tray ①.
2. Set the pickup fully to the disc table side and leave a space of approximately one report paper sheet between it and the disc table.
3. Make sure the disc table is parallel to the main chassis.

Fig. 3-11



3-8. Laser Pickup Removal

■ Cautions when Removing The Laser Pickup For Repairing

1 Before removing the laser pickup, short-circuit the terminals by soldering. This is to prevent damage to the pickup during removal operation (Fig. 3-11).
2. After soldering is completed, remove connectors and lead cables. Be careful not to touch the pickup terminals.
3. When installing the laser pickup, detach the soldered terminals after attaching the connectors and lead cables.

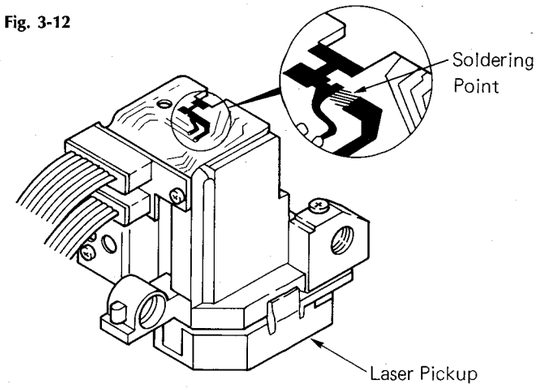
■ Cautions When Replacing The Laser Pickup

1. Before replacing the laser pickup, attach lead cables to connectors and then detach the PCB laser diode protection soldering (refer to the Fig. 3-12 on page 13).

* The solder must be grounded, or otherwise free from current leak.
* Cover the work table with a grounded inductive mat.
* Before starting, be sure to touch the inductive mat or ground cable with both hands to prevent charging of your body.

CD-E70

Fig. 3-12



■ Laser Pickup Removal

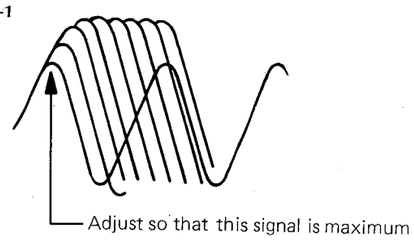
1. Remove the bonnet.
2. Press the OPEN button, opening the disc tray (1).
3. Turn power off.
4. The disc tray itself, pulling it towards you.
5. Remove the 4 screws fixing mechanism chassis.
6. Turn the mechanism chassis over on down side.
7. Solder the pickup terminals as shown in Fig. 3-11.
8. Detach 3 lead connectors on APC Board as shown in 8. PARTS LOCATION on page 19.

4. ADJUSTMENTS (For measuring device connection and adjustment points, refer to Fig. 4-3).

4-1. Focus Balance & Offset Adjustment

1. Put the unit in stop mode.
2) Connect an oscilloscope between TP17 (FE) and TP5 (Vref).
3) Set the oscilloscope range to DC 5mV/DIV, 5msec/DIV
4) Adjust the semi-V.R. R339 (100KΩ) so that DC offset becomes 0V ±10mV.
5) Playback the music recorded disc (any track No. will do).
6) Connect an oscilloscope between TP5 and RF (AC range: 0.2V/DIV, 0.5usec/DIV).
7) Adjust the semi-V.R. R342 (20KΩ) so that RF signal 3T component is maximum.

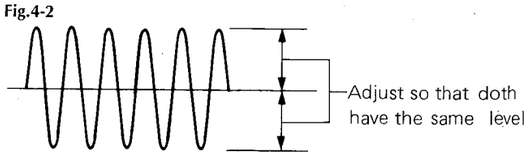
Fig.4-1



4-2. Tracking Error Balance & Offset Adjustment

1) Put the unit in stop mode.
2) Connect an oscilloscope between TP18 (TE signal) and TP5 (Vref).
3) Set the oscilloscope range to DC 5mV/DIV, 5msec/DIV.
4) Adjust the semi-V.R. R337 (100KΩ) so that DC offset becomes 0V±10mV.

Fig.4-2



5) Playback the music recorded disc.
6) Search using the UP/DOWN keys.
7) Adjust the semi-V.R. R309 (100KΩ) so that the search tracking errors DC offset becomes 0V ± 10mV..

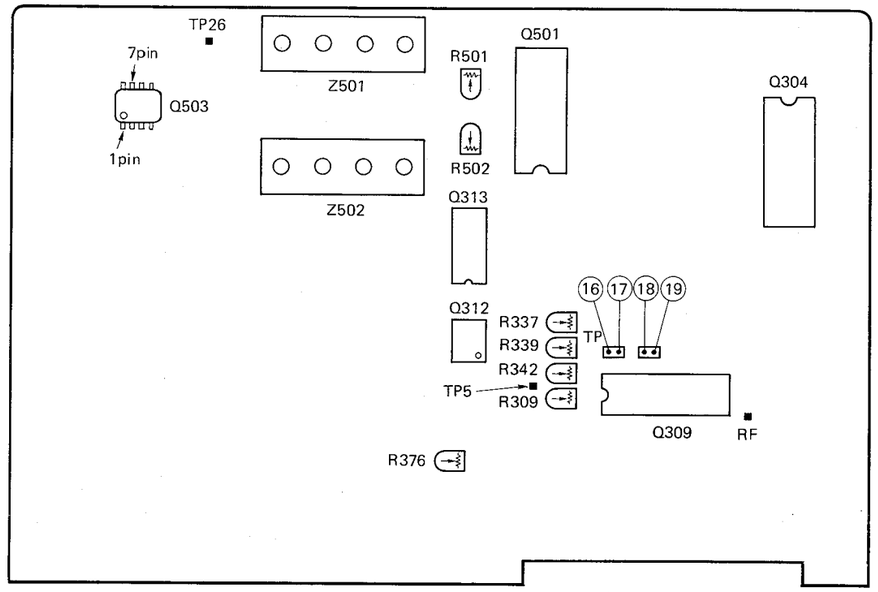
4-3. Analog Output Offset Adjustment

This adjustment is not necessary when replacing the pickup

1) Turn power on.
2) Connect a DC voltmeter or oscilloscope to the main PCB Q503 1 pin (Lch) & 7 pin (Rch), and adjust semi-V.R. R502 50KΩ (Rch) so that DC range offset becomes 0 ± 10mV.

Fig.4-3

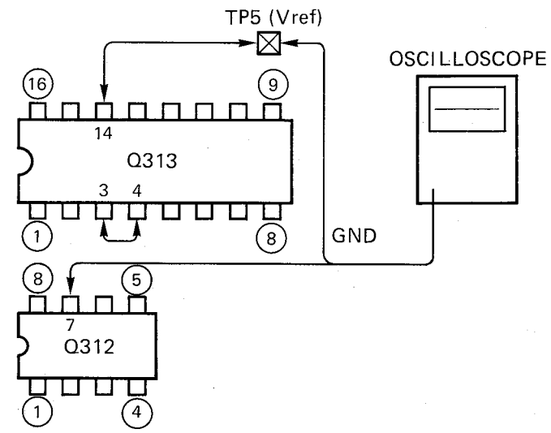
Main PCB Adjustment Points



4-4. Disc Motor Brake Adjustment (after Q312(NJM2904D) or Disc Motor replacement).

1. Short-circuit the Q313 (TC4053BP) 3 and 4 pins.
2. Connect 14 pin to TP5 (V_{REF})
3. Turn power on.
4. Connect an oscilloscope between the Q312 7 pin and TP5 (V_{REF})
5. Set the oscilloscope range to DC 5mV/DIV, 5msec/DIV.
6. Adjust semi-V.R. R376 (50KΩ) that voltage becomes 0 ± 5mV.

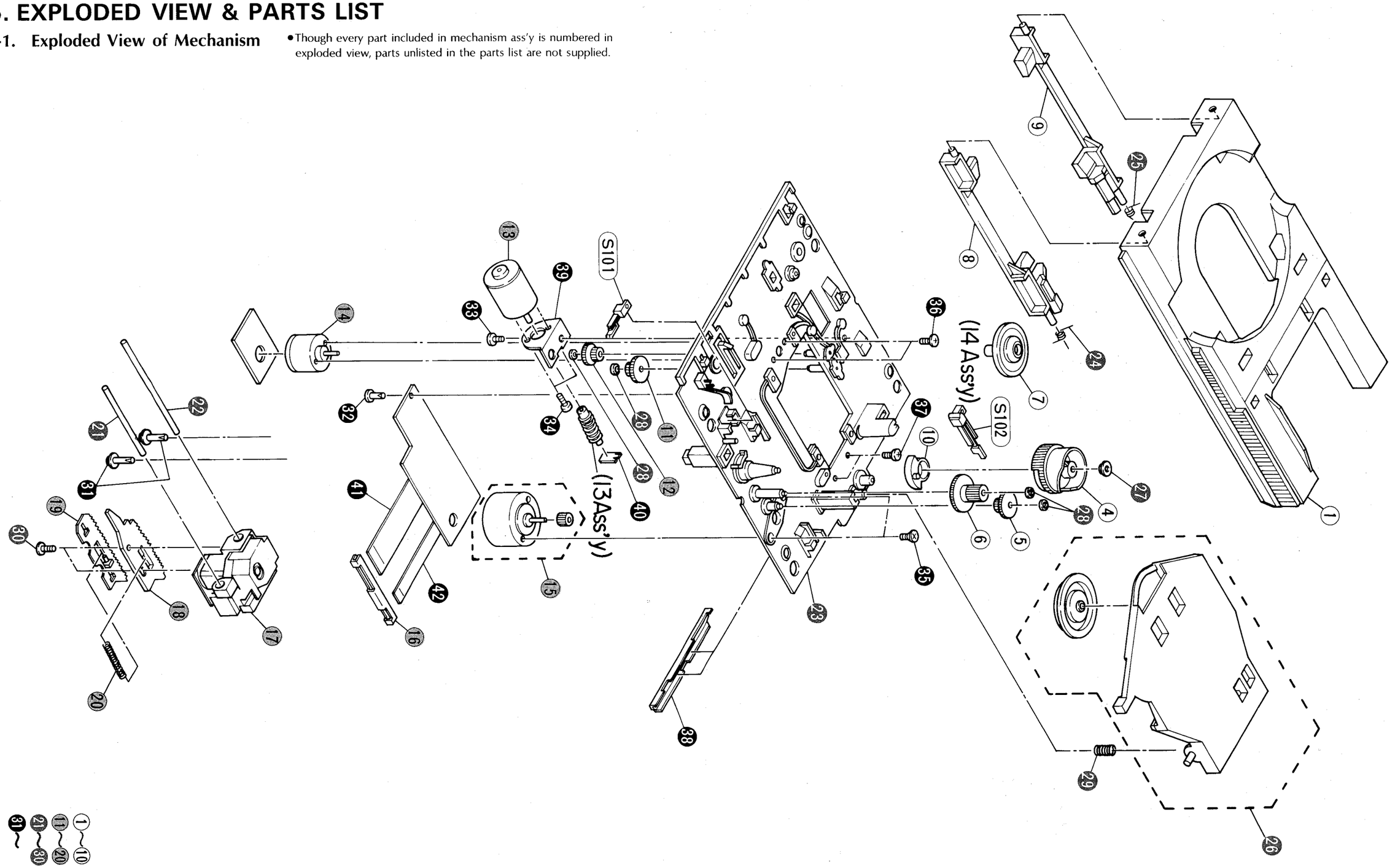
Fig.4-4



5. EXPLODED VIEW & PARTS LIST

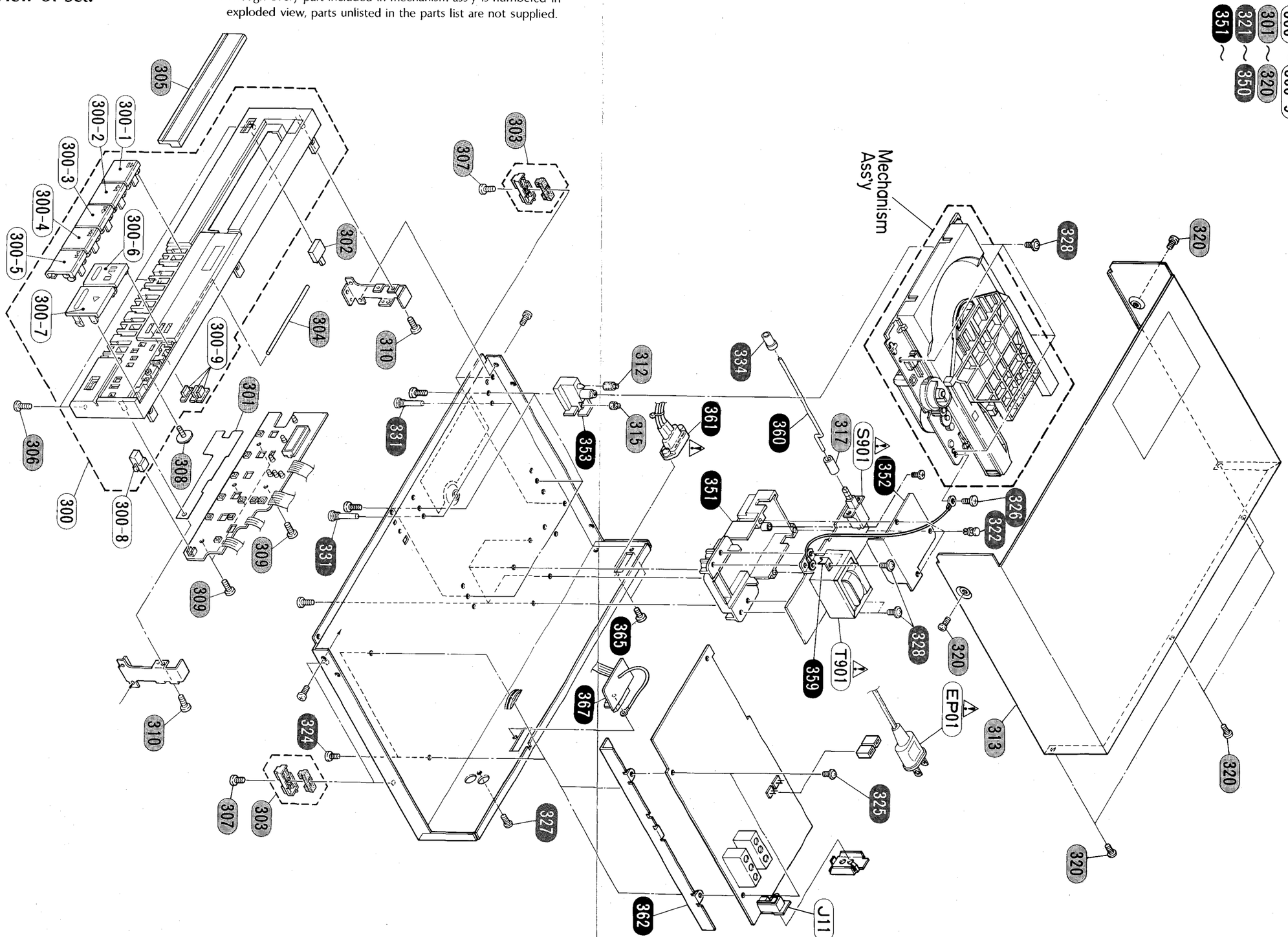
5-1. Exploded View of Mechanism

•Though every part included in mechanism ass'y is numbered in exploded view, parts unlisted in the parts list are not supplied.



5-2. Exploded View of Set.

• Though every part included in mechanism ass'y is numbered in exploded view, parts unlisted in the parts list are not supplied.



< Mechanism Section >

Parts List

Parts No.	Stock No.	Description
1	58229000	Disc Tray
4	58229100	Cam Gear
5	58229200	Drive Gear-A
6	58229300	Drive Gear-B
7	58229400	Disc Table
8	58229500	Disc Lifter-R
9	58229600	Disc Lifter-L
10	58229700	Lever Switch
11	58229800	Gear Pulley Drive-A
12	58229900	Gear Pulley Drive-B
13	58230000	Pickup Motor Ass'y
14	58230100	Disc Motor Ass'y (With Disc Table)
15	58230200	Loading Motor Ass'y
17	58230300	Laser Pickup (With Wire)
18	58230400	Rack Gear-A
19	58230500	Rack Gear-B
20	58230600	Spring, Rack
21	58230700	Guide Shaft A
22	58230800	Guide Shaft B
23	58230900	Main Chassis
24	58231000	Spring, Lifter-R
25	58231100	Spring, Lifter-L
26	58231200	Clamper Lever Ass'y
27	58231300	Bushing
28	58231400	Bushing
29	58231500	Spring, Clamp Lever
30	58232100	Screw, 2.6 × 5 B Type
32	58232200	Screw, 2.6 × 8 B Type
33	58232300	Screw, 2.6 × 5 B Type
34	58232400	Screw, 2.6 × 3 B Type
35	58232500	Screw, 2.6 × 5 F Type
36	58232600	Screw, 2 × 3 B Type
37	58232700	Screw, 3 × 8 B Type
38	58231600	Chassis Support

< Set Section >

Parts List

Parts No.	Stock No.	Description
300	58263400	Front Panel Ass'y
300-1	58264300	Knob, Open/Close
300-2	58264500	Knob, F.B
300-3	58264400	Knob, F.F
300-4	58264700	Knob, Down
300-5	58264600	Knob, Up
300-6	58264200	Knob, Pause/Stop
300-7	58264100	Knob, Play
300-8	58264800	Knob, Auto Spacing
300-9	58264900	Knob, Repeat/Memory/Display
301	58267100	Shield
302	27039700	Knob, Power
303	58266900	Foot
304	58264000	Shaft
305	58263700	Tray Panel
306	58074400	Screw M3 x 8
307	58094800	Screw M3 x 8
308	58266700	Screw M3 x 8
309	58266800	Screw M3 x 8
310	58094800	Screw M3 x 8
312	58261600	Cushion
313	58263600	Bonnet
315	58261700	Cushion
317	58029610	Joint 2.5
320	58266800	Screw M3 x 8 (Black)
322	58220900	Plastic Rivet
324	58094800	Screw M3 x 8
325	58267200	Screw M3 x 8 (Red)
326	58267300	Screw M3 x 6
327	58074500	Screw M3 x 8
328	58262200	Screw M3 x 10
331	58262300	Transport Screw (Red)
334	58029810	Joint Knob, Power
351	58262600	Case, Transformer
352	58267400	Cover, Power
353	58262800	Support-Chassis
359	58262900	Spring, Earth
360	58263910	Rod
⚠ 361	58221500	3P AC Socket
365	58265800	Screw, M3 x 4
367	58224700	10P System Connector
⚠ S901	58031600	Power Switch
J11	58221400	2P Output Terminal
⚠ T901	58227001	Power Transformer (XX)
⚠	58227002	Power Transformer (UL/CSA)
⚠	58227005	Power Transformer (EU)
⚠	58227006	Power Transformer (BS)
⚠	58227007	Power Transformer (AS)
⚠ EP01	58075300	Power Supply Cord (XX)
⚠	58221000	Power Supply Cord (UL/CSA)
⚠	58221200	Power Supply Cord (EU)
⚠	58221300	Power Supply Cord (BS)
⚠	58221100	Power Supply Cord (AS)

6. PARTS LOCATION & PARTS LIST

6-1. Main Board (Stock No. 58265701)

Parts List

Parts No.	Stock No.	Description
• Transistor		
Q302,318	46078801	2SC2458
Q305	07194701	2SA1015
Q311,507 508	46118801	2SC2878
Q506,901	46078701	2SA1048GR
Q902	46118801	2SC2878
Q904,908 911	58032300	2SD1413
Q906,910	58078600	2SA966-Y
• FET		
Q504,505	58031800	2SK365-BL
Q903,905 907,909	58031800	2SK365-BL
• IC		
Q301	58221800	TA7354P
Q303	58033300	PST520D-T
Q304	58225300	TMP-4740N-5534
Q306	58266300	TC9200F
Q307	58266400	TC9201F
Q308	58224000	TC5518BFL-20
Q309	58222000	TA8101N
Q310	58222300	NJM3403AD
Q312	58095400	NJM2904D
Q313	58222200	TC4053BP
Q314,315 316,317	58222100	TA8102P
Q501	58222400	TD6709N
Q502	58225100	TD6102P
Q503	58222500	NJM2068D-D
• Diode		
D301~306	58031500	1SS176
D901,902	58031500	1SS176
⚠ D903,909	58223000	SiVB10
D904,906	58222700	04AZ-6.2Z
D905,907	58222800	04AZ-5.6Y
D908	58222900	04AZ-9.1Y
Z501,502	58223400	Low Pass Filter
Z503	58223500	XTAL X-HC43U-67.738M
L501	58223700	0.22μH inductor
R301	58223610	2.2KΩ × 4 A.R.
R302	58079310	5.6KΩ × 6 A.R.
R309	58223100	100KΩ S.V.R. Tracking Balance
R337	58223100	100KΩ S.V.R. Tracking Error Offset
R339	58223100	100KΩ S.V.R. Focus Error Offset
R342	58223300	20KΩ S.V.R. Focus Balance
R376	58223200	50KΩ S.V.R. Disc Motor Brake
R501,502	58223200	50KΩ S.V.R. Analog Output Offset
⚠ R906	00120000	1Ω 1/2W F.R.
⚠ R907	00121200	2.2Ω 1/2W F.R.
⚠ R908	00120000	1Ω 1/2W F.R.
J011	58221400	2P Output Terminal
⚠ C916	58267700	10000PF 400V C.C. (XX, CSA, UL, AS, EU)
or	58267800	10000PF 400V C.C. (BS)

6-2. Display Board (Stock No. 58265600)

Parts List

Parts No.	Stock No.	Description
• Transistor		
Q201~205	58260000	2SC2710
Q206	46078701	2SA1048
Q207	46078801	2SC2458
• Diode		
D201	58224900	Display indicator, TLR4375
D202~207	58095900	TLS-144
D208~215	58031500	1SS176
Z202	58260100	XTAL, 2MHz
S201	58034500	Tact SW., DOWN
S202	58034500	Tact SW., UP
S203	58034500	Tact SW., PAUSE
S204	58034500	Tact SW., PLAY
S205	58034500	Tact SW., EJECT
S206	58034500	Tact SW., REPEAT
S207	58034500	Tact SW., MEMORY
S208	58034500	Tact SW., Display
S209	58034500	Tact SW., FB
S210	58034500	Tact SW., FF
S211	58263800	Push SW., AUTO SPACE

6-3. APC Board (Stock No.58224600)

Parts List

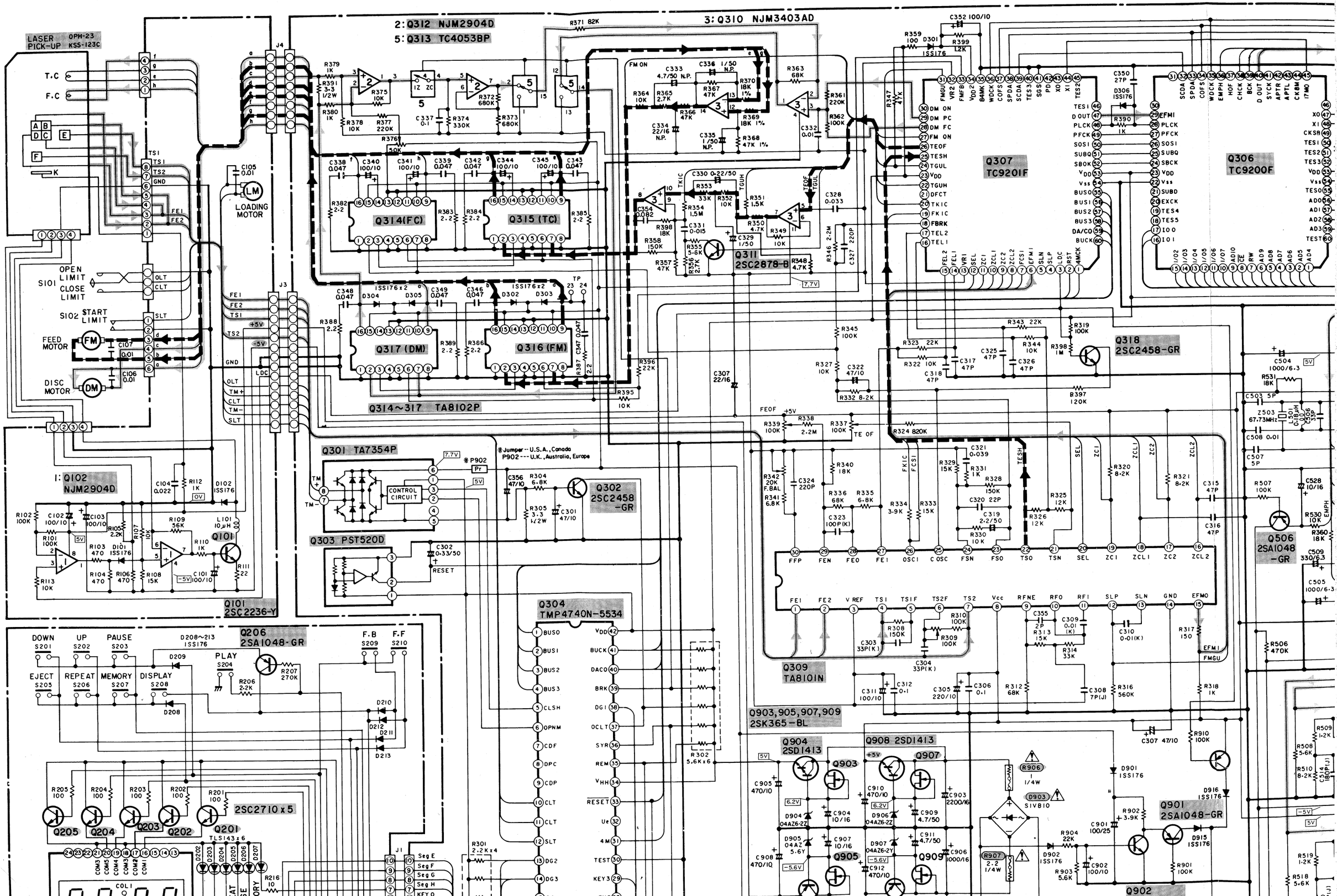
Parts No.	Stock No.	Description
• Transistor		
Q101	58091200	2SC2236-Y
• IC		
Q102	58095400	NJM2904D
• Diode		
D101,102	58031500	ISS176
L101	58224100	Choke Coil, 10μH

6-4. System Control Terminal Board

Parts List

Parts No.	Stock No.	Description
• IC		
Q207	58096100	TC4011BP
• Diode		
D215	58031500	1SS176
T201	58224700	System Control Terminal, 10P

7. SCHEMATIC DIAGRAM



- Design and specifications subject to change without notice for improvement.
- La présention et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
- Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

12 NJM2904D
13 TC4053BP
3: Q310 NJM3403AD
Q307 TC9201F
Q306 TC9200F
Q502 TD6102P
Q308 TC5518BFL -20CTL
Q315 (TC)
Q316 (FM)
Q311 2SC2878-B
Q318 2SC2458-GR
Q501 TD6709N
Q504
Q507
TA8102P
Q302 2SC2458 -GR
Q304 TMP4740N-5534
Q309 TA8101N
Q903,905,907,909 2SK365-BL
Q904 2SD1413
Q908 2SD1413
Q903
Q907
Q905
Q909
Q901 2SA1048-GR
Q506 2SA1048 -GR
Z501
Z502
Z503 67.73MHz
J11 R ch
J11 L ch
* Jumper -- U.S.A., Canada
P902 --- U.K., Australia, Europe
P902
RESET
TP
ISS176 x2
D302
D303
D301 ISS176
D306 ISS176
D916 ISS176
D915 ISS176
D902 ISS176
D901 ISS176
D903 SIVB10
D904 04AZ6-2Z
D905 04AZ6-2Y
D906 04AZ6-2Z
D907 04AZ6-2Y
R906 1/4W
R907 2.2 1/4W
R371 82K
R372 680K
R374 330K
R373 680K
R363 68K
R361 220K
R362 100K
R359 100
R399 1.2K
R347 47K
R390 1K
R381 33K
R529 1.8K
R504 5.6K
R531 18K
R507 100K
R530 10K
R360 18K
R509 1.2K
R508 5.6K
R510 8.2K
R512 22K
R513 470
R511 10M
R522 22K
R519 1.2K
R518 5.6K
R523
R514 220
R516 1K
R515 100K
R517 47K
R524 220
R526 1K
R525 1000P
R527
R501 50K
R502 50K
R503 12K
R505 5.6K
R506 470K
R528 1.8K
R509 1.2K
R343 22K
R344 10K
R345 100K
R319 100K
R323 22K
R322 10K
R327 10K
R332 8.2K
R324 820K
R398 1M
R397 120K
R396 22K
R395 10K
R338 2.2M
R339 100K
R337 100K
R340 18K
R342 20K F.BAL
R341 6.8K
R336 68K
R335 6.8K
R334 3.9K
R333 15K
R329 15K
R331 1K
R328 150K
R330 10K
R325 12K
R326 12K
R320 8.2K
R321 8.2K
R310 100K
R309 100K
R308 150K
R313 15K
R314 33K
R317 150
R312 68K
R316 560K
R318 1K
R902 3.9K
R904 22K
R903 5.6K
R901 100K
R910 100K
R302 5.6K x6
R301 2.2K x4
R305 3.3 1/2W
R304 6.8K
R356 2.7K
R355 5.6K
R357 47K
R358 150K
R398 18K
R354 1.5M
R353 33K
R352 10K
R351 1.5K
R350 4.7K
R349 10K
R348 4.7K
R346 2.2M
R383 2.2
R384 2.2
R385 2.2
R389 2.2
R386 2.2
R387 2.2
C352 100/10
C350 27P
C358 1000P
C353 1000P
C357 22P
C313 100/10
C314 0.1
C333 4.7/50 N.P.
C336 1/50 N.P.
C334 22/16 N.P.
C335 1/50 N.P.
C332 0.01
C328 0.033
C327 220P
C329 1/50
C330 0.22/50
C331 0.015
C354 0.082
C339 0.047
C342 0.047
C344 100/10
C345 100/10
C343 0.047
C349 0.047
C346 0.047
C347 0.047
C307 22/16
C322 47/10
C317 47P
C318 47P
C325 47P
C326 47P
C321 0.039
C320 22P
C319 2.2/50
C324 220P
C323 100P(K)
C315 47P
C316 47P
C355 2P
C309 0.01 (K)
C310 0.01(K)
C303 33P(K)
C304 33P(K)
C311 100/10
C312 0.1
C305 220/10
C306 0.1
C308 7P(J)
C307 47/10
C504 1000/6.3
C503 5P
C508 0.01
C507 5P
C528 10/16
C509 330/6.3
C505 1000/6.3
C510 1800P (J.S)
C511 1800P (J.S)
C512 1800P (J.S)
C513 1800P
C514 180P(J)
C515 1200P(J)
C516 2700P
C517 10/16
C518 10/16
C519 1000P
C527 0.01
C523 10/16
C524 10/16
C522 2700P
C526 0.01
C356 47/10
C301 47/10
C302 0.33/50
C309 0.01 (K)
C355 2P
C313 100/10
C314 0.1
C358 1000P
C353 1000P
C357 22P
C512 1800P (J.S)
C513 1800P
C519 1000P
C525 1000P
C526 0.01
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NJM3403AD
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TA8102P
TC40538P
TMP42C40P
2SA966
2SC2236
TC5518BF
2SA1048
2SC2458
2SD1413
TA8101N
TD6709N
2SK365
TMP4740N
TC9200F
TC9201F
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TD6102P

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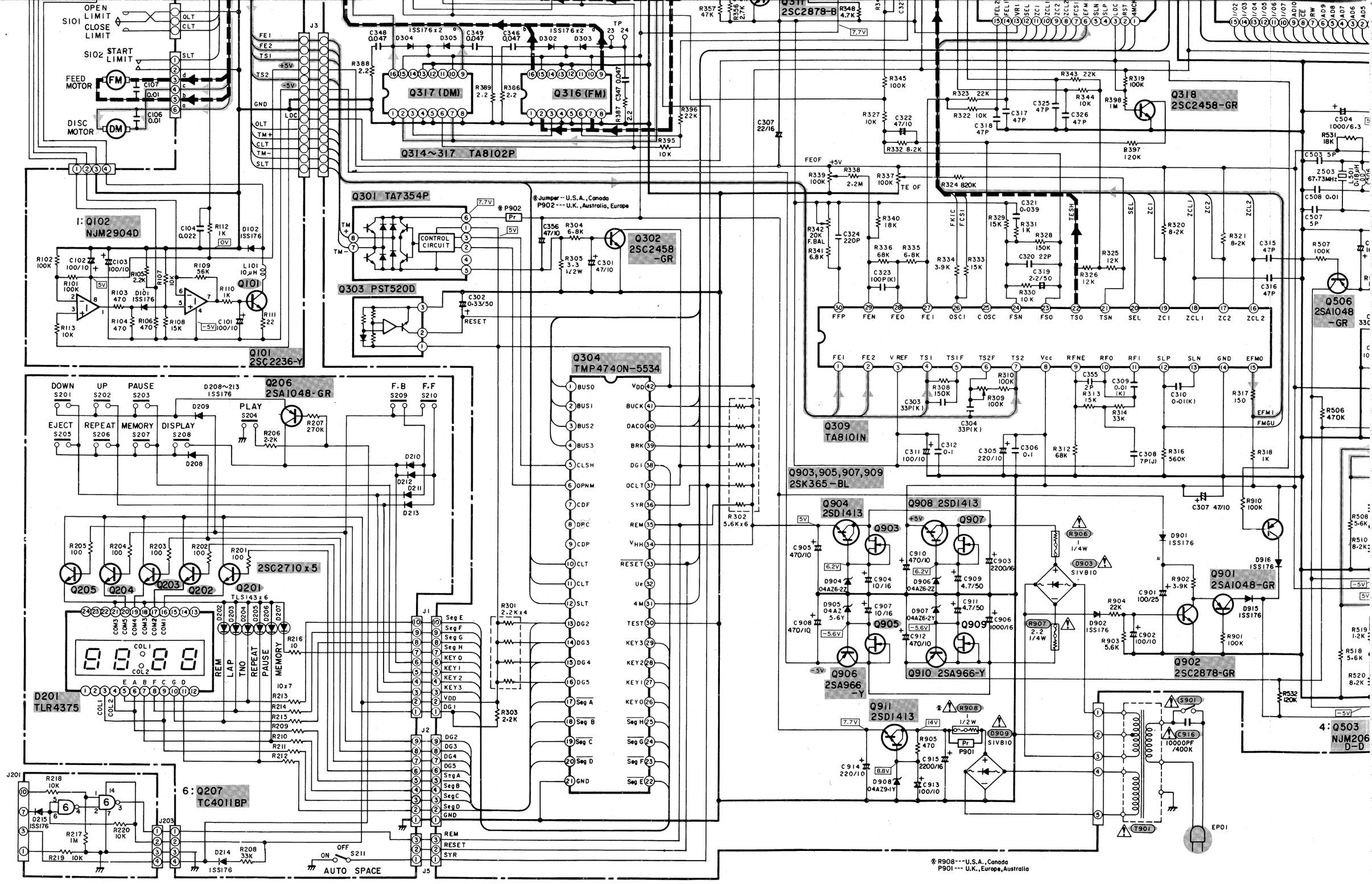


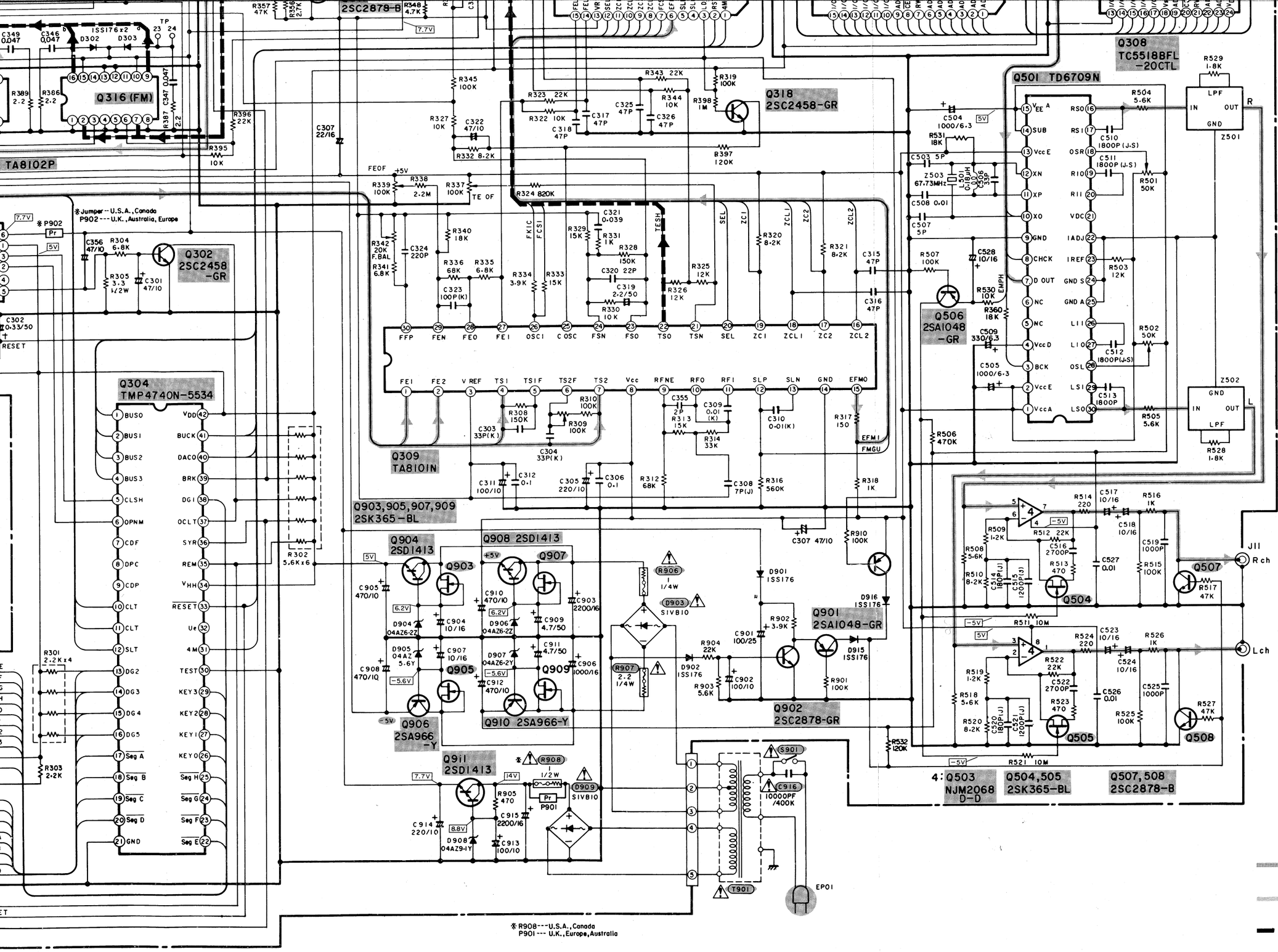
SWITCH POSITION

S101.....Leaf switch tray OPEN/CLOSE.....CLOSE
S102.....Leaf switch pickup Start/Stop Limit.....OFF
S201 208.....Key switch select switch.....OFF
S901.....Push switch power.....OFF

Voltage with cover closed and no disc loaded, power on
Voltage during disc playback

Q309

1	2	3	4	5	6	7	8	9	10	11
2.2 V	2.2 V	2.2 V	2.2 V	2.2 V	2.2 V	2.2 V	4.8 V	2.3 V	1.1 V	2.2 V
X	X	2.2 V	X	1.8 V	1.8 V	X	4.7 V	X	1.8 V	2.2 V
16	17	18	19	20	21	22	23	24	25	26
0.4 V	2.5 V	1.1 V	2.5 V	4.8 V	2.2 V	2.2 V	2.2 V	2.2 V	2.2 V	2.4 V
1.0 V	2.4 V	1.1 V	2.5 V	2.6 V	2.2 V	2.2 V	2.1 V	2.2 V	2.1 V	2.6 V



Voltage with cover closed and no disc loaded, power on

Voltage during disc playback

Q309

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2.2V	2.2V	2.2V	2.2V	2.2V	2.2V	2.2V	4.8V	2.3V	1.1V	2.2V	2.0V	2.1V	0V	0.6V
X	X	2.2V	X	1.8V	1.8V	X	4.7V	X	1.8V	2.2V	2.2V	X	0V	2.5V
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
0.4V	2.5V	1.1V	2.5V	4.8V	2.2V	2.2V	2.2V	2.2V	2.2V	2.4V	2.2V	2.2V	2.2V	2.2V
1.0V	2.4V	1.1V	2.5V	2.6V	2.2V	2.2V	2.1V	2.2V	2.1V	2.6V	2.2V	2.2V	2.1V	2.1V

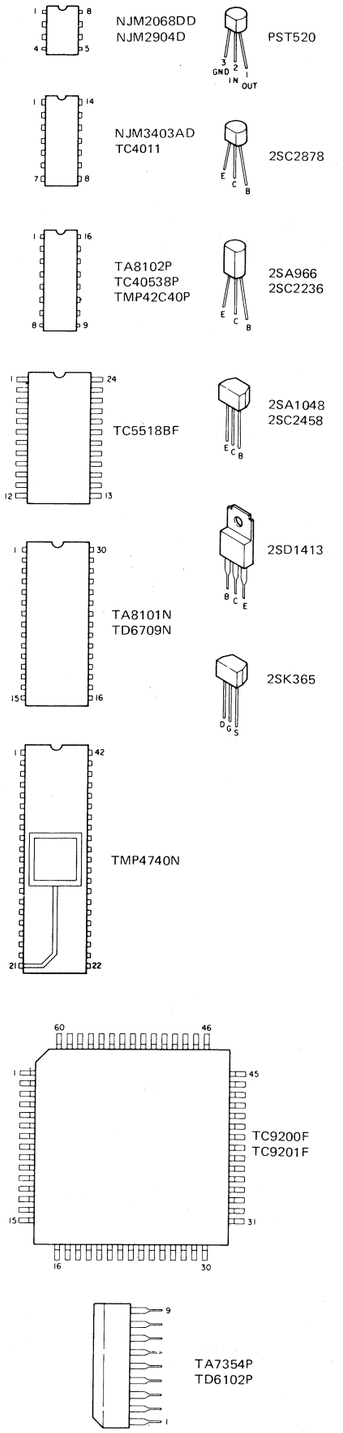
The voltages are measured as STOP mode.
All voltages are measured with a 10MΩ/DC electric voltmeter.

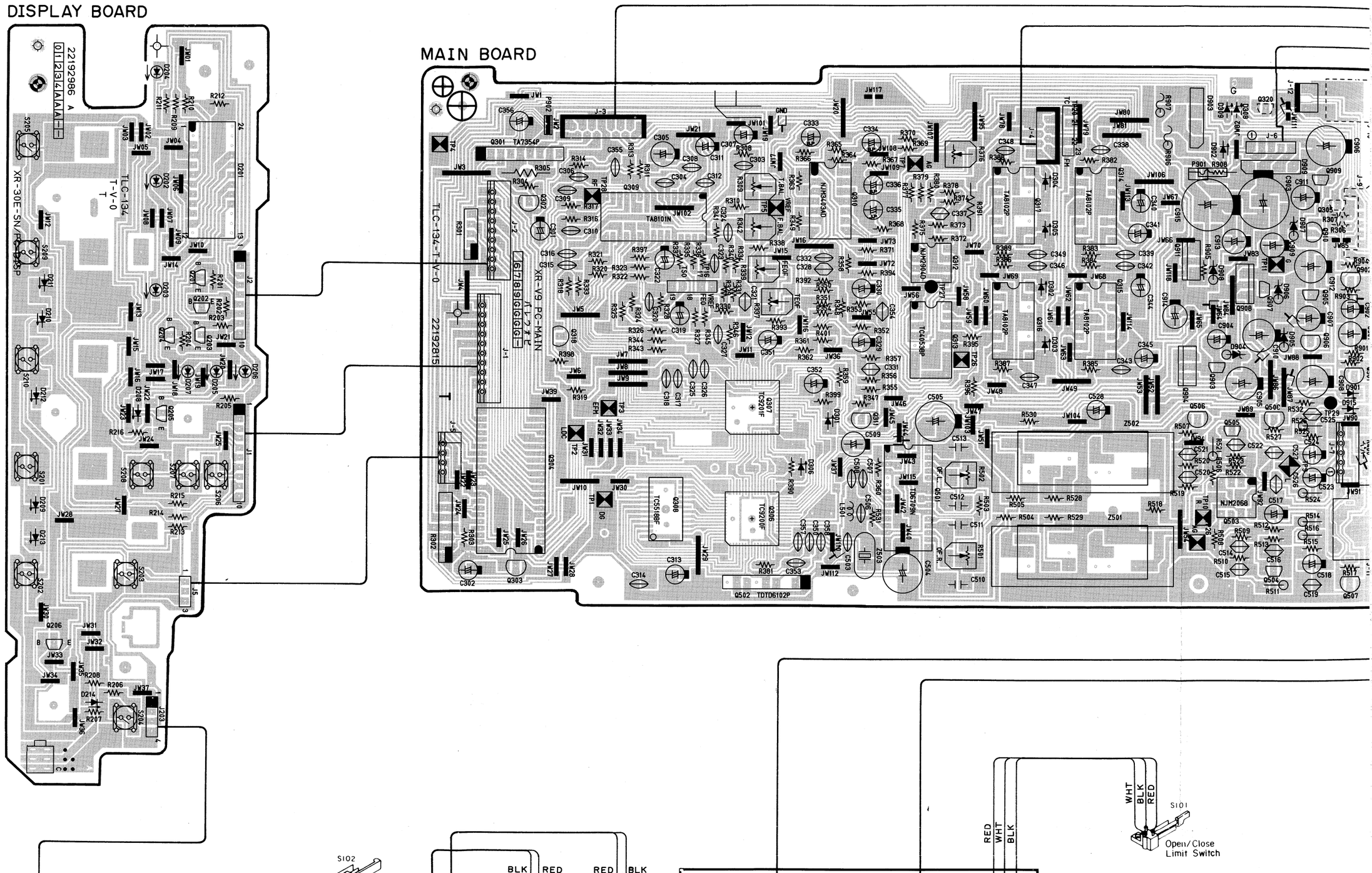
⚠ is Safety Part.
Use only replacement parts recommended by the manufacturer.

Schematic diagram is subject to change without notice.

8. PARTS LOCATION

8-1. Overall Wiring Diagram (PCB Portions are Parts Side)





MAIN BOARD

TLC-134-TV-0 XR-V9-PC-MAIN 2219281S T

Australia
AC240V 50Hz

U.K.
AC240V 50Hz

Europe
AC220V 50Hz

U.S.A., Canada
AC120V 60Hz

Power Cord

S102 Start Limit Switch

BLK RED RED BLK

BLK RED

S101 Open/Close Limit Switch

RED WHT BLK

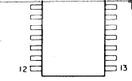
WHT BLK RED

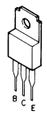
Loading Motor

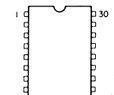
Laser Pickup

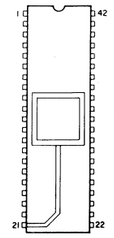
T901

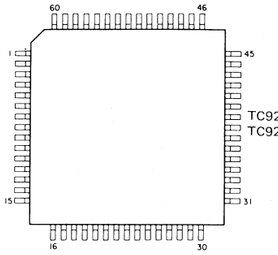
TLC-134-TV-0 2815

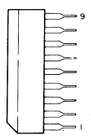


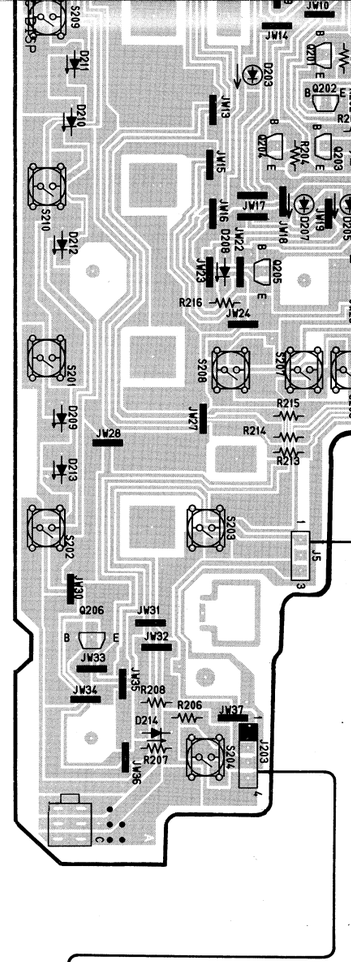








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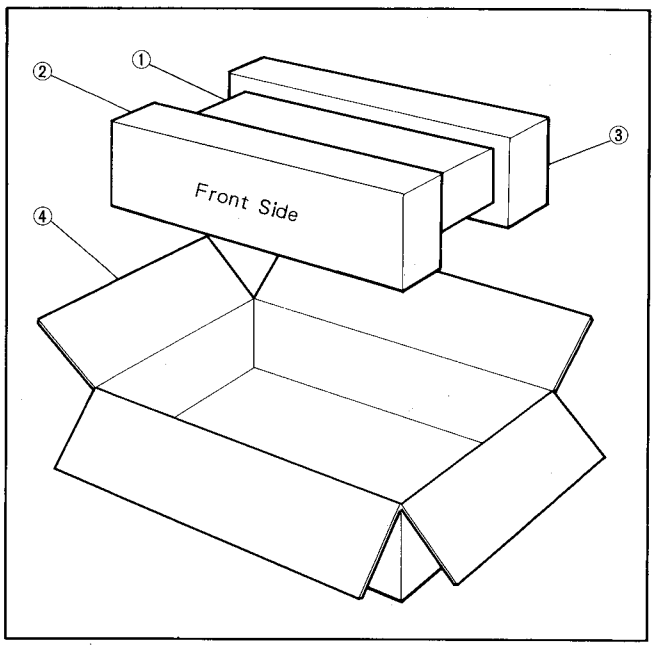
TC5516BF
TC5518BF
TC5518BP
TC5516BF
TC9200F
TC9201F
TC6709N
TA8101N
TD6102P
TA7354P

9. PACKING LIST

Parts No.	Stock No.	Description
1	58097500	Vinyl Bag
2	58265400	Strofoam Packing (Front)
3	58265500	Strofoam Packing (Back)
4	58265300	Carton Case



10. ACCESSORY LIST

Parts No.	Stock No.	Description
	58265100	Operating Instruction (UL, AS, BS)
	58266600	Operating Instruction (XX, CSA, EU)
	58048600	Pin Plug Cord
	58075300	Power Supply Cord (XX Only)